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June 1981
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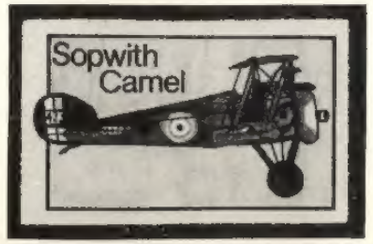

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June 1981 Vol 14 No 6

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Cover: Pictured high over the Severn valley countryside are the front six Hawk T1s of the 'Red Arrows' aerobatic team heading a 'wineglass' formation and descending past banks of cumulus during the latter stages of a loop. Part One of an article describing a flight with the internationally-renowned team and its operations is featured on pages 266-271 of this issue.
Photo: Allan Burney

Frontispiece: The sleek lines of the General Dynamics F-16 Fighting Falcon are well illustrated in this view of an aircraft from the newly re-equipped 428th TFS/474th TFW at Nellis AFB, Nv. The F-16 is carrying under-wing fuel tanks and practice bomb containers and is seen during a refuelling rendezvous with a KC-135 tanker of the 22nd ARS/22nd BW. The refuelling pattern lay over part of the US referred to as 'Four Corners' — the area where the borders of Nevada, Utah, Colorado and Arizona meet. *Photo: Frank Mormillo*

The Editor is pleased to receive contributions in the form of articles, letters and photographs. Items accepted will be retained and paid for at standard rates on publication; those he is unable to use can only be returned if they are accompanied by a stamped addressed envelope, otherwise they will be filed for possible future use.

Material, either commissioned or freely submitted, is provided at the contributor's own risk and Ian Allan Ltd cannot be held responsible for loss or damage.

Below: Two Boeing 737s of Britannia Airways at Leeds/Bradford Airport and showing the airline's new and old livery. The new scheme is featured on the left aircraft, G-BOSL *Sir Frank Whittle*, while the right B737, G-BAZH *Sir Frederick Handley Page*, carries the old markings. The airline's build-up to the Boeing 767 is described on pages 260-263 of this issue.
Photo: Colin Addison

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'Air Europe 671'

The editor regrets that due to space restrictions in this edition of *Aircraft Illustrated*, the concluding part of the article on Air Europe, 'Air Europe Six Seven One', has had to be held over to next month's issue.

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airscan

Paul Humphreys

HOW TIMES and the business of designing commercial aeroplanes have changed. Time was when autocratic designers sat down with pencil and paper, had a swift chat to their engineers and salesmen, and then drew plans and wrote specifications for the type and size of aircraft that they believed the airlines needed.

It was not so long ago — at least it seems that way — that airlines were only concerned with flying aircraft from A to B and with keeping them clean and serviceable. Load factors, block times, APEX and wide-bodies were things of the future and it was often the case of 'kick the tyres, fire 'er up, and off into the clag regardless'. Of such stuff were Imperial Airways, Deutsches Lufthansa and Air France made. But before we scoff, just look where it got them. Using aircraft which were either immediately available, or which had been designed to meet a variety of needs, the world's airlines assembled their foundations with aircraft which were obtained almost off-the-shelf.

But then the keen edge of competition began to draw blood, the economic whizz-kids and efficiency experts got to grips with the business, the passengers became more demanding and soon, he who paid the piper wrote out the specification. No longer were sales teams hammering on doors trying to sell Concordias and Apollos, Azors and Conestogas. Instead, airlines were hammering the manufacturers to produce airframes and engines which would be economical at every stage of ownership — cheap to buy, cheap to operate, cheap to maintain. Today it's called 'cost of ownership'. And today, too, the airlines know what they want and are competent to set out in every last detail their requirements for each new aeroplane.

Among the latest of these is Delta Air Lines, which is looking for a short-medium haul 150-seater and has issued its 'spec'. It's all there, from the basic details like 'it should be a twin-engined aircraft' right through to 'provision should be made for sensor installation to enable on-wing module performance analysis'. In between come things like nose-wheel steering angle, choice of instrumentation, engine nacelle design, external dimensions and position of wheels and engines. Plus just about every other design feature one can think of.

Whatever happened in the past when, for example, the Brabazon Committee created a range of civil transport projects among which were the Dove and the Brabazon: today the airlines and the manufacturing industry have to work closely if both are to benefit.

Too often in Britain we have seen them holding each other to ransom in a determined effort to inject their own individual and peculiar features into the final design, which has made the aeroplane virtually unsaleable to any other customer. This chauvinism on the one hand allied to technical and commercial *hara-kiri* on the other helped to open the door to almost total domination of the world's air transport fleets and routes by Boeing, Lockheed and McDonnell Douglas. It also condemned the British transport aircraft manufacturers to comparatively short-run production programmes — with a few notable exceptions. But name me a British civil aircraft programme which has gone into four figures.

Sic transit Bristol, de Havilland, Handley-Page and Avro.

A bullish Boeing

With thought processes moving along the well-greased grooves of commercial aviation, the impending launch of the latest variant of the Boeing 737, the -300, which is to be re-engined with 20,000lb thrust CFM-56-3 turbofans, is causing raised eyebrows in some quarters. Has Boeing gone too far out on a limb which could wither and drop off?

More than 740 B737s have been delivered, and another 180 are still on the order books for future delivery. However, some present operators and potential customers are not wholly convinced that the change of engine, and other 'mods' to accommodate it, will make the -300 economic. Some believe that this 120-150 seat variant is not quite what they are looking for. True, it is promised to be quieter and more fuel-efficient than earlier versions, but its take-off performance is not so good and it is lacking the powerful reverse-thrust feature which is so useful in current B737 variants.

One gets the feeling that operators in the market for a new 150-seat fuel-efficient aeroplane want a new 150-seat fuel-efficient aeroplane embodying all the advanced technology features. It's difficult to imagine that Boeing has got all its sums wrong, but in any event, the future of the Boeing 737-300 will be one that bears watching.

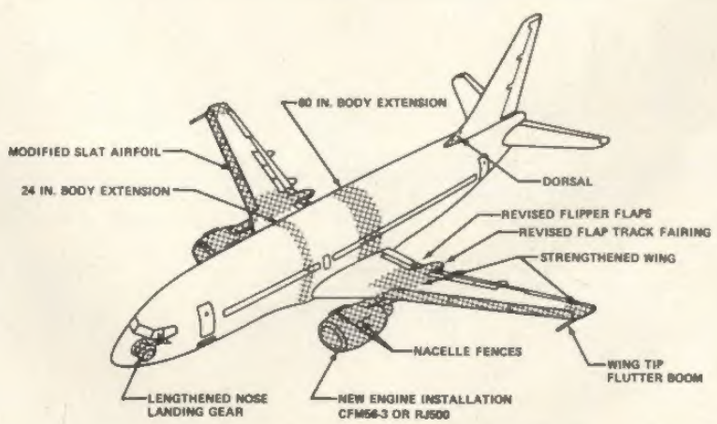
VC10derness

Still on the air transport theme, how sad it is to see the splendid VC10 pass out of British Airways service after 17 years. During this time it has notched up a 100% safety record. Not many aeroplanes have made 250,000 landings — and presumably an equivalent number of take-offs — and have carried in excess of 13 million happy passengers and harmed nary a one of them. Sad, too, that the Super VC10s are being 'reduced to produce' and will be used to provide spares for Royal Air Force aircraft. But it's good to know that George Edward's big bird, which was such a success on our national carrier's routes, continues in vital service with the RAF as a trooper and tanker.

Below: A September 1980 drawing of the modifications to be incorporated into the latest derivative of the Boeing 737 — the turbofan-powered -300.
Drawing Boeing

Modifications

737-300 Derivative



airnews

Above: The Learjet Longhorn Model 55, the first in the Longhorn '50 series', secured its FAA air transport category type certificate in March 1981. Supporting the aircraft's US transcontinental range capability are its two 3,700lb turbofan engines, normal operating altitude of 51,000ft and distinctive, thrust-enhancing winglets.
Photo: Gates Learjet Corp

BAe unveils A310 wing

The first A310 Airbus wing was removed from its jig at Broughton, Chester on 7 April 1981, in ceremonies that represented the first public demonstration of Britain's participation in the European A310 programme.

The wing box removed from the jig weighs over five tons (5.25 tonnes), has an area of 437 sq ft (40.6 sq m) and a length of over 70ft (21.54m). After removal, further components are installed and fuel testing carried out. The wing was scheduled for delivery to VFW's Bremen factory in May for equipment installation and will then be flown to Toulouse for mating to the A310 fuselage. The airliner will make its maiden flight in spring-1982 with initial deliveries commencing in spring-1983.

The new A310 is approximately 20ft (6.10m) shorter than the standard A300 B2/B4 versions, but retains the same fuselage cross section, common design philosophies and manufacturing techniques of the larger aircraft. However, to achieve maximum efficiency in the smaller A310, British Aerospace has designed an entirely new wing. The resultant profile is noticeably different from the previous A300 wing and features a marked double curvature particularly on the inboard undersurface.

British Aerospace is spending between £200 million and £250 million as its share of the launching costs of the A310 and this investment covers design and development, manufacture and purchase of jigs and tools and education costs. A total of six A310 wing assembly jigs are planned at BAe Chester, two of which are now complete and the third under construction. In 1981 British Aerospace will deliver the first four sets of A310 wings and 43 sets of A300 wings. The production programme will increase through to 1984 to reach up to eight wing sets/month, which will be divided approximately half and half between the A300 and A310.

Flight testing of RNorAF Lynx

The first of six Westland Navy Lynx helicopters for Norway is completing its flight test programme at Westland Helicopters, Yeovil. Royal Norwegian Air Force (RNorAF) pilots started conversion training at Yeovil in mid-May and this will be followed by operational training at RNAS Yeovilton. The RNorAF Lynx incorporates comprehensive avionics equipment fits and the aircraft was completed exactly on time for the contract which was signed almost three years ago. The Lynx, intended for coastguard duties, will be delivered to Norway later this year.

Longhorn 55 certificated

The transcontinental Learjet Longhorn Model 55, the largest business jet to be produced by the Gates Learjet Corporation, received its FAA Type Certificate on 18 March 1981. Initial deliveries of the Model 55, the first type in the 'Longhorn 50'-series to be certificated, began in late-April; the three models in the series — the 54, 55 and 56 — differ only in fuel capacity and operational weight limits. Powered by twin Garrett TFE 731-3A-2B turbofan engines, the Model 55 is the first Learjet to offer a stand-up cabin and can accommodate up to 10 passengers. The type features distinctive winglet aerofoil sections (hence the Longhorn name) and, according to the manufacturer, orders for over 150 have been received. There are 27 new Longhorns on the assembly line at Gates Learjet's facility at Tucson, Az and the production rate is planned to build-up to five/month by spring-82.

Air UK launches commuter network

Air UK has launched a series of commuter air services using Embraer Bandeirantes and taking in six southern England airports and five European destinations. Operated under the brand name 'Air UK Commuter Services', the routes have been chosen with the needs of the business traveller in mind and will operate: London (Southend)-Dusseldorf and -Ostend; Southampton-Paris and -Amsterdam; Exeter-Paris and -London (Gatwick); Jersey-Paris; and London (Gatwick)-Rotterdam. Some of these routes were already flown by the carrier but frequencies have been increased.

TR1s for Alconbury

Mr Geoffrey Pattie, Under Secretary of State for the RAF, announced in Parliament on 31 March 1981 that the USAF would deploy a new squadron of Lockheed TR1 all-weather tactical reconnaissance aircraft to RAF Alconbury, Huntingdon, in the near future. 'The role of the aircraft will be to provide timely tactical reconnaissance information in all weathers about the deployment and movement of enemy forces in a time of crisis or war. This will reduce the likelihood of surprise attack and enable NATO commanders to deploy their own forces in the best way to resist aggression. The deployment of these aircraft will involve additional construction work at Alconbury, estimated cost about £40m over a five-year period'.

Spring exercises

RAF Strike Command took part in a naval exercise off Gibraltar during the first two weeks of April. Aircraft from RAF St Mawgan, Cornwall; RAF Scampton, Lincs; and RAF Lossiemouth, Moray, Scotland, combined with Royal Navy ships and submarines in anti-air warfare and anti-submarine exercises. The purpose of exercise **Springtrain 81**, from 31 March-

15 April, was to provide ship weapon, tactical and seamanship training for destroyers, frigates and submarines. RAF aircraft taking part were two Nimrods from St Mawgan's No 42 Squadron and seven Buccaneers of No 12 Squadron, Lossiemouth, which were all based in Gibraltar. Two Vulcans from No 27 Squadron, Scampton, were based at Montijo, Portugal, for the duration of the exercise; four Royal Navy Canberras and three RN Hunters also participated.

The first in a three part series of NATO exercises called **Cloudy Chorus** was held on 7-9 April 1981. The exercise involved air forces from Belgium, Canada, the Federal Republic of Germany, the Netherlands, the UK and USA — units from the Danish Air Force belonging to the northern region of NATO also took part. The purpose of the 'Cloudy Chorus'-series of exercises is to practise and evaluate tactics and procedures of the air forces of the NATO central region and it provides a major flying exercise constituting a valuable test of NATO operational capabilities. More than 2,500 sorties were flown during its three day duration. A small number of aircraft from RAF Strike Command were involved although the majority of RAF sorties were flown by Buccaneers and Harriers from RAF Germany.

Britain's air defences were realistically tested, when aircraft of the RAF and the air forces of seven other nations participated in exercise **Priory 1-81** from 13-15 April. The exercise — the latest in a continuing series — consisted of attack sorties flown at high, medium and low-level and also periods of electronic warfare. 'Attacking' forces encountered by RAF air defence aircraft included: RAF (Vulcan, Canberra, Buccaneer, Jaguar, Hunter and F-4); USAF (F-4, F-111 and A-10); GAF (F-104, F-4); RDAF (F-35); RNethsAF (F-5, F-104); BAF (Mirage V, F-104); FAF (Mirage IV, Jaguar); and CAF (CF-104). Simulated attacks were made against RAF radar stations at Boulmer, Northumberland, and Staxton Wold, North Yorkshire, and the following RAF bases: Binbrook and Coningsby, Lincolnshire; Bawdsey and Wattisham, Suffolk; West Raynham, Norfolk; and North Coats, Humberside. Aircraft taking part in the exercise also used the RAF air weapons ranges at Wainfleet, Holbeach and Donna Nook, Lincolnshire; Spadeadam, Cumbria; Cowden, Humberside; and Jurby, Isle of Man.

Space Shuttle success

The arrival of a new era in spaceflight was heralded by the successful mission of the American space shuttle *Columbia* — the first re-usable rocketship. *Columbia* completed its maiden flight on 14 April 1981 when, after 54hr in space during which it orbited 36 times, it was brought into a fully controlled landing on a dry lake bed at Edwards AFB in California's Mojave Desert. The astronauts for the flight were John Young and Bob Crippen. It is hoped to feature a report and photographs of the event in a future edition of *Aircraft Illustrated*.

airnotes

The US Army will receive an additional 15 Modernised AH-1S helicopters (an advanced version of the TOW-capable HueyCobra) from Bell Helicopter Textron. This is a follow-on order to a contract awarded on 29 July 1980 which called for 12 AH-1S helicopters; deliveries of the aircraft will be from May 1982-February 1983.

•

Transamerica Airlines has ordered an additional five of its fleet of stretched DC-8s to be retrofitted with General Electric CFM56 turbofans. The airline had previously ordered re-engining of seven of its DC-8 fleet. Eight DC-8 operators have placed orders for retrofitting of their aircraft; United Airlines, Delta Airlines, Spantax, Capitol International Airways, Jet Aviation, Flying Tiger Line, the French Air Force and Transamerica.

•

The 8th Squadron of the 14th 'Radio Aids Survey and Electronic Warfare' Wing of the Italian Air Force received its first Aermacchi MB339s during an official ceremony held at Pratica di Mare AB on 16 February 1981. The 8th Squadron is responsible for the in-flight checking of on-the-ground air navigation and Air Defence electronic/radio aids.

•

An RAF flying instructor who safely landed his crippled Jet Provost training aircraft after a total engine failure, is to receive a gallantry award. The Queen's Commendation for Valuable Service in the Air is awarded to Flt Lt Thomas Paul McDonald, a qualified flying instructor with the Refresher Flying Squadron at RAF Leeming, Yorkshire.

•

Two Surveillance Cheyenne aircraft ordered by the west African nation of Mauritania were delivered in April. The Surveillance Cheyenne is a modified version of the Cheyenne II, equipped with special radar and cameras for aerial surveillance work; the aircraft will be operated on fishing ground patrol along 700 miles of Mauritanian coastline.

•

BP Petroleum Development (UK) Ltd has awarded a contract to British Airways Helicopters for the provision of two BV234 Chinook helicopters to service the offshore construction and hook-up phases of the Magnus Oilfield development. The contract, due to commence on 1 August 1982, will be for an initial period of 15 months (with options to extend) and is valued at approximately £9 million.

•

Beech Aircraft Corporation rolled out its 3,000th commercial Bell JetRanger airframe in March, marking a milestone in its production of helicopter airframes for Bell Helicopter Textron; to date Beech has received orders from Bell for more than 5,635 commercial and military airframe assemblies.

•

American Airlines has purchased three Boeing 747 freighters from the Flying Tiger Line effectively doubling the size of its B747F fleet. The newly-acquired aircraft will be phased into service between May-August and, according to the airline, 'will enable American to expand B747F freighter service in major markets and at the same time discontinue use of its inefficient B707 freighter fleet'.

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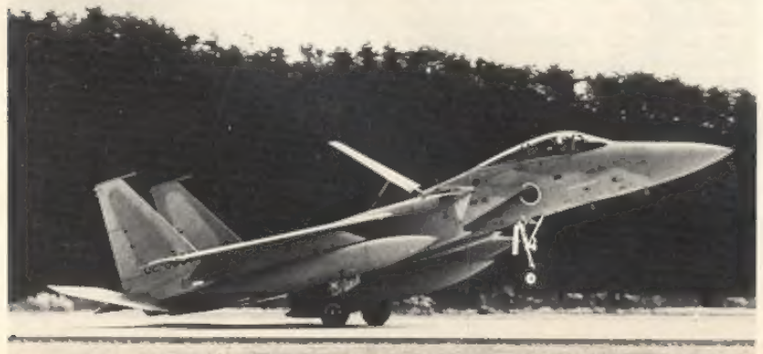

Left: The first F-15J Eagle for the Japan Air Self Defence Force landing at Gifu AB on 27 March 1981 after its ferry flight from the US via Kadena AB, Okinawa. JASDF procurement of the Eagle will total 100 aircraft, comprising 92 single-seat F-15Js and eight two-seat F-15DJs. *Photo: Konan Ase*

Above: A new summer service for 1981 brought this ex-Trans International DC-10, N101TV, to Gatwick Airport on 4 April in the green and blue colours and markings of Air Florida. *Photo: Graham Finch*

The first McDonnell Douglas KC-10A Extender advanced tanker/cargo aircraft was delivered to the USAF on 17 March 1981. The KC-10 (a military derivative of the commercial DC-10 srs 30CF) is the first of 12 aircraft on order and after official handing-over ceremonies at the manufacturer's Long Beach, Ca facility, the aircraft flew to Barksdale AFB, La where it will be based.

•

Eastern Airways inaugurated a new scheduled service from Humberside to Heathrow via Norwich using a DC-3 Dakota on 27 April 1981 — the only DC-3 scheduled passenger service in Western Europe. The aircraft, G-AMPO, was built in 1944 and was acquired by Eastern Airways in 1979.

•

The new BAe 146 four-jet feederliner will be rolled-out at BAe Hatfield on 20 May 1981. British Aerospace has indicated that the maiden flight of the type will be this summer and that certification is set for August 1982. By late-1982, 18 aircraft will be ready for delivery and 21 will have been built. The first seven aircraft will be BAe146 srs 100s (88-seater) and the initial srs 200 (109-seater) is scheduled to fly in May 1982.

•

Twelve Northrop F-5 Tiger IIs (consisting 10 F-5Es and two F-5Fs) are to be purchased by Mexico in the government's modernisation of the armed forces.

•

Thirty-six General Dynamics F-16 Fighting Falcons are to be received by South Korea it was announced in March. The aircraft will be partly funded from US military credit.

Airliner Orders

Airline	*Aircraft*	*No*	*Ordered*	*Delivery date*
Aerocaribe*	EMB-110P1 Bandeirante	1	Mar 81	81
Air Afrique*	Airbus A300	2-cn	1 Mar 81	n.d.
Air France	Boeing 727	2	Feb 81	n.d.
Eastern Airlines*	Airbus A300 B4-200	9-f-c/o	Nov 80	n.d.
	Airbus A300 B4-200	5-o	Nov 80	n.d.
	Airbus A300 B4-600	21-o	Nov 80	n.d.
Garuda*	Airbus A300 B4-200	3-f-c/o	18 Mar 81	c-e-82
Mobil Oil*	DHC Dash 7	1-f	Feb 81	Dec 81
		1-o	Feb 81	n.d.
Monarch Airlines	Boeing 757	2	Feb 81	n.d.
Southwest Airlines (USA)*	Boeing 737-300	10-f	18 Mar 81	c-Dec 84
		10-o	18 Mar 81	n.d.
TAA*	Airbus A300 B4-100	1-f-c/o	23 Feb 81	Dec 82
Thai Airways International*	Airbus A300 B4-600	2-f-cn	6 Feb 81	1-84
Wardair*	Airbus A310	6-f	25 Mar 81	Oct-Nov 83 (2), 84 (2), & 85(2)
		6-o	25 Mar 81	n.d.

Notes

Airliner Orders

Aerocaribe: (Aerovias Caribe SA) The Mexican commuter airline (based at Cancun) will use the Bandeirante mainly to transport tourists visiting the Mayan ruins.

Air Afrique: The conversion of two A310 orders (placed by the airline on 21 April 79 — see *Jul 79*, p309) into A300s, raising Air Afrique's total A300 order to three. The first aircraft was scheduled to be delivered in May.

Eastern Airlines: The recently announced conversion to firm orders of the nine A300B4 options held by the airline (see *Jun 78*, p268) plus 26 new options — five A300B4-200s and 21 A300B4-600s. Eastern Airlines at present operates the largest A300 fleet with 19 aircraft in service and six more to be delivered before the end of 1981; the airline plans to operate a fleet of 60 A300s by the end of 1986.

Garuda Indonesian Airlines: The carrier has converted three A300 options into firm orders and now has nine A300s on firm order, with three options.

Mobil Oil: The aircraft will be Singapore-based and used in support of exploration, development and production activities in southeast Asian oilfields. In addition to personnel movement, the Dash 7 will carry general freight.

Southwest Airlines (USA): A second launch order for the new B737 variant — the turbofan powered -300 (see *May 81*, p203). The airline has also indicated that it plans to take out a further 20 options on the type.

TAA: (Trans Australia Airlines) The conversion into a firm order of one of three options held by TAA for the A300B4-100.

Thai Airways International: The airline has converted two of its four options for A300B4-200s into firm orders for the B4-600, the two remaining options becoming B4-600s as well.

Wardair: This purchase agreement is significant in that it marks the second Airbus customer in North America after Eastern Airlines, and the first A310 customer on the American continent. Wardair plans to introduce the A310s on routes throughout Canada, and to the United States, Mexico, and the Caribbean Islands; the aircraft will be configured for 222 passengers in a single-class.

Airliner Deliveries

Airline	*Aircraft*	*No*	*Delivered*	*Date ordered*
Air Canada	Boeing 727	1	Feb 81	Aug 79
Air Europe*	Boeing 737-200	1	20 Mar 81	29 Feb 80
Air France	Boeing 727	2	Feb 81	n.d.
ALIA*	Boeing 727	1	Feb 81	May 79
All Nippon Airways*	Boeing 747SR	1	Feb 81	1978
Aloha Airlines*	Boeing 737	1	Feb 81	Apr 80
Cameroon Airlines*	Boeing 747 Combi	1	Feb 81	Jul 79
Continental Air Lines	Boeing 727	1	Feb 81	n.d.
DLT*	BAe 748 srs 2B	1	23 Mar 81	22 May 80
Frontier Airlines*	Boeing 737	1	Feb 81	n.d.
Iberia*	Airbus A300 B4-100	2	16 Mar 81 & 23 Mar 81	28 Dec 78
	Boeing 747	1	Feb 81	n.d.
Indian Airlines	Boeing 737	1	Feb 81	n.d.
Kuwait Airways*	Boeing 727	1	Feb 81	Aug 79
Lufthansa*	Boeing 737-230	4	Feb 81	n.d.
Mexicana	Boeing 727	1	Feb 81	n.d.
Orion Airways	Boeing 737	1	Feb 81	n.d.
Piedmont Airlines	Boeing 737-200	3	Feb 81	n.d.
Republic Airlines*	Boeing 727	1	Feb 81	n.d.
SAS*	Airbus A300 B2-300	1	12 Mar 81	Dec 77
Singapore Airlines*	Airbus A300 B4-200	1	20 Mar 81	9 Apr 79
US Air*	Boeing 727-200	1	Feb 81	n.d.
VARIG	Boeing 747 Combi	1	Feb 81	n.d.

Notes

Airliner Deliveries

Air Europe: The airline's sixth B737 is registered G-DDDV and named *Peggie* (see *Aug 80*, p345).

ALIA: (The Royal Jordanian Airline) The third B727 in the four aircraft order reported in *Aug 79*, p360.

All Nippon Airways: Believed to be the airline's 12th example of the type.

Aloha Airlines: Delivery of the first B737 in the order reported in *Jul 80*, pages 296-297.

Cameroon Airlines: The airline will use the B747 Combi, TJ-CAB, on its regional and international route system which stretches from Africa throughout Europe.

DLT: Frankfurt-based DLT (Deutsche Luftverkehrsgesellschaft mbh) will operate the BAe748 on routes which serve 10 major cities in Germany as well as Basle, Switzerland. The aircraft is the first of three of the type for the airline — see *Aug 80*, p345.

Frontier Airlines: The aircraft is registered N7353F.

Iberia: The airline's first two A300s (and also the first A300B4s to be powered by Pratt & Whitney engines) are registered EC-DLE and EC-DLF.

Kuwait Airways: The aircraft is registered 9K-AFC and is the final B727 in the three-aircraft order reported in *Nov 79*, p 516 (see also *Jan 81*, p9).

Lufthansa: Continuing deliveries in Lufthansa's order for 36 Boeing 737-230s. The first -230s received by the airline (see *Apr 81*, p153) are now being operated on various routes around Europe, including Copenhagen, Vienna, Munich, Zurich, Cologne/Bonn, Hamburg, Paris-Orly, Frankfurt, Brussels, Linz and Graz.

Republic Airlines: The airline's sixth B727 is registered N716RC.

SAS: (Scandinavian Airlines System) The fourth Airbus for the airline is SE-DFL. SAS, which took delivery of its first A300 in early-February 1980 (see *Apr 80*, p152), operates its A300s from Copenhagen to London, Paris and Madrid, and in Scandinavia between Copenhagen, Oslo and Stockholm.

Singapore Airlines: Registered 9V-STC, this aircraft is the third Airbus for the airline in an order for six (see *Jun 79*, p256).

US Air: The fifth B727 purchased by the airline.

Key:

n.d.=no details, e=early months of year, m=mid-year, c=commencing date, cn=conversion, f=firm orders, o=options, c/o=converted options, *=see notes.

airbooks

Jane's encyclopedia of aviation *compiled and edited by Michael J. H. Taylor with contributions by Bill Gunston, A. J. Jackson, David Mondey, Malcolm Passingham, John Stroud and Susan H. H. Young, published by Jane's Publishing Company (comprising five separate volumes all illus text throughout incl colour) at* ***£45.00*** *the set*

A collection that is at once a delight and a disappointment. A delight because, as one might expect with this distinguished team of contributors and under the editorship of Michael Taylor, the text is clear, concise and comprehensive and is difficult to fault. In this regard, it is fully up to the standards that we have come to expect from Jane's over the years and even the high price of £45.00 would not be a deterrent to most enthusiasts who want on their bookshelves a thoroughly readable, reliable and detailed guide to the evolution of aviation — from its earliest days to the exploration of space. Some of the entries, notably those concerning some of the better-known wartime aircraft, are little gems of concise writing in themselves. The disappointment, however, is in the production of the books. The initial impact is good: five volumes in blue imitation leather bindings nicely boxed together with attractive spine brasses. But from then on the quality of the work is a major disappointment — in the first place, the layout is basically unimaginative. The pictures are far too small and little attempt has been made to keep the text and the relevant photographs in phase. The result is that one has to look back over several pages after finding an interesting photograph to locate the equivalent text. The captioning and the colour quality are unusually poor.

Farnborough: the story of RAE *by Reginald Turnill and Arthur Reed, published by Robert Hale Ltd (224pp plus 40pp illus) at* ***£8.95***

Described by the publishers as 'the first full-length book on the Royal Aircraft Establishment (RAE) and its ten outstations', **Farnborough: the story of RAE** provides a fascinating account of this birthplace of military aeronautics — from the day the flamboyant Samuel Cody recorded the first powered aircraft flight in the UK on 16 October 1908 (over Laffans Plain), to modern research carried out on supersonic flight, satellites . . . etc. The RAE has pioneered many developments in aviation, suffice it to say that virtually every aspect of flying has benefited from its thorough investigations. The authors are to be commended for producing an informative book on the Establishment with many interesting anecdotes. A foreword has been written by Concorde test pilot Brian Trubshaw and the publication is illustrated by some 40 pages of black & white pictures that span RAE's distinguished history.

Barnes Wallis: a biography *by J. E. Morpurgo, published by Ian Allan Ltd (400pp text plus 16pp illus) at* ***£11.95***

One of the most remarkable figures in British aviation history was Sir Barnes Wallis who died on 30 October 1979 aged 92. During his long life Barnes Wallis was responsible for such designs as the R80 and R100 airships, the Wellesley and Wellington bombers, the dambusting 'bouncing bomb', and the Tallboy and Grand Slam bombs. In later years, he turned his attention to swing wing concepts. These and many other achievements are related in this third edition of J. E. Morpurgo's biography of Barnes Wallis, which describes the designer's life in an all-embracing manner. It provides a frank insight into the personality of Wallis who although essentially a mild Christian man nevertheless attracted enemies as readily as he found admirers. On reading the original edition, Barnes Wallis is understood to have said to his biographer 'How did you find out so much about me?'

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Police vehicles of the world *by Roy D. Ingleton, published by Ian Allan Ltd (156pp illus text) at* ***£7.95***

Although the content of **Police vehicles of the world** is directed mainly towards ground-based machines, a 23-page section features helicopters and light aircraft utilised by various police forces — it is this part of the book that is reviewed here. Information on each aircraft type is given in the form of brief technical data (accommodation, engines, rotor diameter, fuselage length, gross weight, speed and range) supported by a summary text. In very few instances are numbers of aircraft and operational details made clear and, as is often the case in publications of this kind, some of the information has already been overtaken by events — for instance there is no mention of the Bell 222 helicopter, as operated by the Metropolitan Police.

■ Modern Combat Aircraft

B-52 Stratofortress — MCA8 *by Jeff Ethell and Joe Christy and* ***F-104 Starfighter — MCA9*** *by Arthur Reed, both published by Ian Allan Ltd (128pp illus text incl 8pp colour and 112pp illus text incl 8pp colour respectively) at* ***£6.95*** *each*

Two further titles in the publisher's 'Modern Combat Aircraft' series, and the featured subjects perhaps rate as two of the most controversial aircraft ever to have been produced by American manufacturers.

Nearly 30 years after the **B-52 Stratofortress** prototype made its maiden flight in 1952, the type still provides the backbone of US strategic airpower — and it is expected to soldier on in operational service until the 21st century as an ALCM carrier! If the latter becomes reality then, as the authors so rightly quote in their preface, the B-52 will have to be regarded as 'the most successful military aircraft ever built'.

The B-52, or 'Buff' as it is popularly referred to, was the last in a series of strategic bombers designed by Boeing, and its history is adequately spanned in this book — from its rather lengthy gestation period to its operations in Vietnam and its expected future development. A series of appendices provide useful information on 'model differences', 'operational B-52 units and bases' etc and, in keeping with other books in the MCA series, photographs are of a good quality. The text is informative throughout although the style of writing may not suit everyone's taste.

Conceived at Lockheed's famous 'skunk works' by Kelly Johnson and his team, the **F-104 Starfighter** had a remarkably swift development programme — it made its maiden flight in 1954 only two years after design had begun. Proclaimed by many as a 'missile with a man in it', the F-104 became the subject of much adverse criticism as its reputation for being a 'hot and unforgiving' aircraft grew; a facet of the type's history that was highlighted by the unacceptably high attrition rate that accompanied its entry into service with the German Navy and Air Force. Although the operational life of the F-104 is now drawing to a close, the type still remains in service world-wide and apart from production in the US and Canada, it was also licence-built in large numbers in Europe by Germany, Italy, Holland and Belgium. The fortunes of this illustrious aircraft are traced in Arthur Reed's well-researched book and chapters include 'From high-up to low-down', 'Starfighters in combat' and 'Specials and one-offs'.

■ Serial listings

Civil Aircraft Markings 1981 *by Alan J. Wright, published by Ian Allan Ltd (192pp incl 10pp illus) at* ***£1.50***

Military Aircraft Markings *by Peter R. March, published by Ian Allan Ltd (96pp incl 8pp illus) at* ***£1.50***

These two companion volumes, now in their 31st and 2nd editions respectively, consist of pocket-sized reference guides to aircraft seen around the UK.

Civil Aircraft Markings continues in its long established format and, as ever, it provides an exhaustive directory of UK-registered aircraft plus a section dealing with foreign aircraft most likely to be seen at UK airports on scheduled or charter services. Each registration is catalogued in alphabetical order (with a special out-of-sequence inventory) detailing the aircraft's type and owner/operator. A new feature of the 1981 edition is a 'future allocations log' that enables new in-sequence registrations to be recorded as they are issued or seen.

A Panavia Tornado is featured on the jacket of the 1981 listing of **Military Aircraft Markings**, which contains new and revised details on all current aircraft carrying service serial numbers in the British Isles, encompassing all UK military examples (including those deployed overseas), USAF and USN machines based in the UK and the current Irish Army Air Corps fleet.

An amendment to last year's 'Military Aircraft Markings' is the inclusion of the complete fiscal year designations for USAF aircraft — also featured are 'historic aircraft carrying USAF serials', 'RAF maintenance cross-reference' and 'RN engineering cross-reference'. With only a 25p increase over the 1980 issue, this edition contains an additional 16 pages.

■ WW2 aviation

Aircraft of WW2 *by Bill Gunston, published by Octopus Books Ltd (208pp illus text colour throughout) at* ***£4.95***

German Maritime Aircraft — WW2 photo album No 18 *by Bryan Philpott, published by Patrick Stephens Ltd (96pp illus) at* ***£3.95*** *(paperback) or* ***£5.50*** *(hardback)*

Spitfire — in action *by Jerry Scutts and* ***Messerschmitt Bf109 — in action (part 1)*** *by John R. Beaman Jr and Jerry L. Campbell, both published by Squadron/Signal Publications (58pp incl 2pp colour and 50pp incl 2pp colour respectively) at* ***£2.50****

* Distributed in the UK by Arms and Armour Press, Lionel Leventhal Ltd, 2-6 Hampstead High Street, London NW3 1QQ

Mustang — the story of the P-51 fighter *by Robert W. Gruenhagen published by Prentice/Hall International (252pp illus text) at* ***£5.00***

'Major aircraft of WW2' might perhaps have been a more accurate title for **Aircraft of WW2** as there are only 40 different aircraft featured within its pages — at a superficial glance notable absentees are the Messerschmitt Me163, the Westland Lysander, Short Stirling . . . etc. Colour profiles (some 600 in all) illustrate the book throughout and provide a valuable aid to modellers. The concise text and captions have been supplied by Bill Gunston and the publishers are to be commended for keeping the price down to £4.95.

German Maritime Aircraft is No 18 in the publisher's WW2 photo album series, and like its predecessors the photographs are drawn from the files of the *Bundesarchiv*, Koblenz.

Two other books extending an established series are **Spitfire — in action** and **Messerschmitt Bf109 — in action (part 1)**. While these two soft-cover, landscape-format publications are enjoyable and well-presented, they nevertheless add little to the wealth of material already unearthed on these famous adversaries. Modellers however will find the books useful and the photographs reflect the times admirably.

Mustang — the story of the P-51 fighter is an accurate account of North American's sleek and aesthetically-pleasing thoroughbred. Like the Spitfire and Bf109, the history of the P-51 is well documented — especially its combat record — but this publication is valuable in its detailed account of the aircraft's engineering and production. There are plenty of pictures — most agreeable, as the Mustange was always easy on the eye — but the design of the book is unadventurous.

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Left: Piaggio P166, G-APWY, just prior to its last flight at Southend on 19 February and its handing over to the Historic Aircraft Museum.
Photo: Alan Wright

Museum retirement for Marconi's P166

Alan Wright

THE ONLY Piaggio P166 still operating in Western Europe outside its native Italy, was retired on 19 February when Marconi Avionics formally handed over G-APWY to the Historic Aircraft Museum at Southend.

It had been with the company for some 13 years, playing a considerable part in the development and demonstration of modern avionics systems. Prior to this, 'WY was one of several P166s used as air taxis by McAlpines, the UK agent for the type. After the sale, its association with the previous owner continued since it was both hangared and maintained by the Luton-based company. In addition, Marconi had the services of a McAlpine pilot whenever required. For much of its life the aircraft was in the hands of Captain Sid Brisk, who of course was at the controls for its final flights.

During its career, the P166 flew to airfields all over Europe on its demonstration duties in all types of weather conditions. It could reach northern Italy without refuelling quite comfortably, its range with a full load being around 1,200 miles. Back in the UK, the aircraft performed with equal reliability on its test and development work. Much of this flying was done using a straight stretch of river in north Cambridgeshire as a reference. A convenient number of bridges and locks provided useful points for checking against the equipment displays.

The choice of aircraft was made in the 1960s when Marconi's requirements were for a machine which could be modified internally to house the constantly changing equipment under test with the minimum of structural disturbance, at the same time giving ample room for the engineers. It was also necessary to provide a comfortable cabin for potential customers during demonstration flights. The large unpressurised cabin of the P166 fulfilled these needs admirably.

One of the earliest tasks for 'WY was to fly the AD370 automatic direction finder during its test programme. This equipment is still in production at the company's Basildon factory from where 6,000 units have been sold to date. The aircraft's final contribution was to accommodate the new AD660 Doppler Velocity Sensor. This has already gained valuable export orders from US manufacturers including Boeing, which at customer request, has installed the system in the 737s of British Airways and Lufthansa. The company confidently anticipates considerable sales will be forthcoming, with the advanced AD660 continuing the success story of the earlier AD370. Between these two came numerous other developments, all of which took to the air on board G-APWY

The aircraft has always aroused great interest wherever it was visited, sometimes to the dismay of the company, more than the equipment it was displaying! Customs officers have also been intrigued by the distinctive shape of the P166. They apparently were always convinced it contained numerous hidden panels for the concealment of contraband! Needless to say their searches were never warranted.

Piaggio developed the P166 from the earlier gull winged P136 five seat amphibian, retaining many of the features of the latter design. Deliveries started in 1959, the year in which the first two examples appeared on the UK register. At the end of the year, G-APWY became the third of its type to be registered, initially being used for demonstration and air taxi work. The type could seat up to 10 including the pilot, although it was normally employed in a six or eight seat configuration. With Marconi, 'WY carried four comfortable seats in its cabin plus the two up front. The area behind the main bulkhead housed the avionics, but could when necessary include a toilet, small galley or two extra seats.

The high slung engines and wing position allowed the fuselage design to offer a very small ground clearance. Steps were therefore unnecessary to enter the aircraft, the immediate reaction being surprise at the degree of spaciousness for a machine of its class. Each of the seats was alongside a particularly large window, while from the raised flight deck an excellent view was afforded through the deep windscreen and side panels. Another benefit derived from the design was that it allowed all but the tallest persons to stand upright or move about with ease. Individual seat lighting and ventilation was provided for passenger comfort.

Although dispensing more than its fair share of decibels externally, the pusher installation of the twin Lycoming GSO-480 engines of 340hp each, ensured a very low noise level within the cabin. Its final flight took 'WY around the Basildon factory to say farewell to staff who, during the last 13 years, had acquired quite an affection for the unusual company machine. The somewhat blustery conditions also served to demonstrate the stability of the P166.

With all these virtues, it could seem strange that 'WY has been retired. However, a growing company need for something with a greater speed and height capability forced the decision to be taken. Certainly no one can say the P166 was speedy as it trundled along at around 200mph. In fact it has been said that it was as strong as the Rock of Gibraltar and flew as fast! This being the case, the company reluctantly decided to use their Navajos for much of the work, with the occasional hiring of a larger machine when necessary.

Despite having much to commend it, sales of the P166 were somewhat disappointing. Unfortunately the initial cost was high while spares were not always easy to obtain quickly. In the event nine appeared on the UK register, some of which were resold abroad, while a few remained in McAlpine service. Eventually these were scrapped, although the fuselages were returned to the manufacturers for use with the turboprop version, which is still available.

Although now grounded, G-APWY's presence in the Museum should further cement relations between the airport and the company, which will continue to fly equipment and customers from Southend albeit in other aircraft. Hopefully it will also help to remind visitors and local residents that the airport plays a vital part in the success of industry in the area.

The Central Flying School

Roger Lindsay

THE OPPORTUNITY to fly all four of the RAF's last remaining airworthy Gloster Meteors within the space of a few days can fairly be described as virtually unique, yet this was recently all in a week's work for Sqn Ldr Bruce McDonald, one of a select team of aircrew who together constitute that specialised branch of the Central Flying School known as Examining Wing. While it would be wrong to suggest that this example was a typical task, it does illustrate the diversity of the Examining Wing's work, which makes it among the most interesting as well as important units within the Royal Air Force.

Established within RAF Support Command, the Central Flying School (universally referred to as the CFS), has been headquartered at RAF Leeming, six miles west of the pleasant North Yorkshire market town of Northallerton, since 1977 following the closure of its former home of long standing, Little Rissington, in Gloucestershire and then a short spell at Cranwell. As a preface to my visit to Leeming I was privileged to meet Air Cdre Dennis Allison, Commandant of the CFS, who identified the importance of the School, the aim of which in official parlance is 'to develop and maintain the highest possible standards of flying of both fixed and rotary-wing aircraft throughout the Royal Air Force'. Air Cdre Allison emphasised that because it now costs the RAF more than £1million to train a pilot to fly an aircraft to fully operational requirements it is vital to ensure that flying training is of the highest possible standard.

The primary role of the CFS is the selection and training of Service pilots to become Qualified Flying Instructors (QFIs) for which it is organised into several specialised squadrons, four of which are at Leeming: two Jet Provost Squadrons, numbered 1 and 2; the Bulldog Squadron, and Training Squadron which is mainly concerned with standardisation of flying instruction, and flies both Jet Provosts and Bulldogs. The CFS Hawk Squadron is based at RAF Valley, while the Helicopter Squadron, equipped with Gazelles, operates out of RAF Shawbury, and the small Gliding Squadron is stationed at RAF Syerston. The 'Red Arrows' aerobatic team, flying Hawks at RAF Kemble is yet another part of the CFS organisation. Many pilots volunteer for QFI training, although others are assigned when Support Command requirements cannot otherwise be satisfied, there being five selection criteria: (a) Flight Lieutenant or lower rank; (b) at least 3½ years to serve; (c) 500+ flying hours as first pilot, or operational squadron experience; (d) assessed as average or higher in last flying appointment; (e) good example to students in the air and on the ground.

QFI students come from up to 60 overseas air arms as well as the three British services (RAF, Fleet Air Arm, and Army Air Corps), and in the current year the CFS is scheduled to train a total of 92 British and 14 foreign fixed-wing students to instructor standard, plus 70 rotary wing students, 17 of whom will be from the British forces. The Fixed Wing Instructors' Course comprises an initial 5 weeks' ground phase, followed by a week's aeromedical and combat survival training at North Luffenham, then the 4 weeks' flying conversion phase. The succeeding 16 weeks are occupied by the all important instructional flying phase at the conclusion of which the students become QFIs with the Category B2 (on probation) and are posted to a Flying Training School, the RAF College Cranwell, or the Refresher Flying Squadron in the case of a Jet Provost pilot, No 4 FTS for Hawk pilots, or any one of the 16 University Air Squadrons or the Royal Navy Elementary Flying Training Squadron for an instructor who has qualified on Bulldogs.

After six months' experience at his unit the new QFI has his category up-graded to B1 (Average). Before he can progress further up the instructional ladder to the A2 (Above the Average) category he must have acquired about 250 hours as a QFI and been successfully assessed by the CFS Examining Wing, which involves a flying sortie and a ground exam. Comparatively few QFIs manage to gain the coveted A1 category, which identifies the holder as being 'Exceptional and Gifted'; he will also have at least 400 flying instruction hours to his credit. Re-categorisation to A1 can only be earned after passing two check-ride sorties with an Examining Wing staff pilot, and an associated ground examination.

'Quality Control' is the term used to define the second CFS role, this being achieved by Examining Wing, with visits to Support Command units, supplemented by CFS Agents on front-line operational units throughout the three British military air arms. Commanded by Wg Cdr Mike French, CFS Examining Wing has a team of 21 examiners comprising 10 Basic pilots (covering Jet Provost, Bulldog and Chipmunk aircraft), 4 Advanced (Hawk, Jetstream, Dominie), 2 Glider, and 1 Helicopter pilot, and 4 Rear Crew (two navigators, an Air Engineer, and an Air Electronics Officer). With the exception of the glider and helicopter examiners, all are based at Leeming, although the four Rear Crew members of the team spend much of their time at RAF Finningley, where they ply their trades aboard Dominies of No 6 FTS. Wg Cdr French believes that the Wing's Rear Crew component would grow in importance with the advent of the Panavia Tornado.

Charged with maintaining the highest standards of flying instruction, Examining Wing staff make about 1,300 individual tests a year, and visit up to 80 different flying units; these include not only all the Flying Training Schools, University Air Squadrons, and Air Experience Flights within Support Command, but also those civilian flying clubs which are nominated under the RAF's flying scholarship scheme. A visit to an FTS can involve more than one examiner, and usually lasts two weeks, during which they aim to test 50% of the QFI's and the students. When I expressed surprise that student pilots should be tested, Wg Cdr French commented, 'A check ride with a student enables us to see how well he's being taught, which in turn tells us quite a lot about his instructor! During our visits we're looking for trends as well as the standards of flying instruction. We look at other things too, such as the degree of standardisation in the unit, and we observe the level of flight safety — this includes a practice crash to test the rescue services, usually done during the last sortie at the end of the day, to minimise the disruption it can create.' Wg Cdr French continued, 'We also exercise practice emergencies in the aeroplane, to test not only the person being tested but the unit's system for coping with it.' If the station being visited has a flight simulator the Examining Wing staff will see its resident instructor to check that standard training procedures are being followed. At the end of every visit the Examining Wing hold a final discussion with the unit's Chief QFI during which the examiner(s) deliver an in-depth commentary on what they have seen, and relate this to the performance required. After every visit a report is required from the examiner, and this has usually to be written up upon his return to Leeming. I also found it rather surprising that Examining Wing travel to the units they visit by road and a quick study of their comprehensive, colour-coded, scheduling board revealed that their visiting programme must involve them in covering almost as many miles on four wheels as they log in the air!

While the majority of the Examining Wing's tests are done at the user unit's home base, others take place at Leeming, notably the 'A' re-categorisation tests and Instrument Rating Examiner (IRE) checks. Examining Wing 'borrow' a Hawk from Valley for a short period once a month for those Advanced tests which are necessary at Leeming, plus some staff con-

Above left: CFS/RFS Jet Provost T5A, XW320, flying at 2,000ft over the White Horse, Kilburn, N Yorkshire. Piloted by Sqn Ldr Eddie Rouse, XW320 was the lead aircraft of the two-ship formation in which the author flew.
All photos by Roger Lindsay

Left: SA Bulldog T1s — XX637/Z (left) and XX631/W (right) — just prior to departing from RAF Leeming on a formation flying exercise.

Below: Currently among the CFS's fleet at RAF Leeming, is third production Jet Provost Mk 3, XM349/H — now a T3A (note the distinctive snub-nose). T3s are also identified with letter codes as opposed to the more usual number codes that are applied to the station's T5As, which are pooled between the CFS and the RFS.

Above: At the time of the author's visit to RAF Leeming, the oldest aircraft on the CFS inventory was Chipmunk T10, WB697; its immaculate red/white/grey paintwork belies its age.

tinuation training. A few staff pilots are also current on operational types of aircraft, which is a useful asset, but the main source of feed-back from the front-line units stems from the CFS Agents, of whom there are more than 30, with at least one agent for each of the 29 generic types of aircraft which are in service. The majority of Agents, who are responsible to Examining Wing, serve as instructors with the Operational Conversion Units, and in Wg Cdr French's own words, 'their job is to see if our product meets front-line requirements, and also how well it performs when it gets there'. Examiners from the Wing go to the OCUs as often as possible to retain a close collaboration with their Agents, and the CFS at Leeming also hosts an Agents' Conference.

Without doubt the most fascinating visits made by Examining Wing team members are those to overseas air arms, and these are of two kinds: firstly the regular liaison visits to comparable flying training organisations, usually in other NATO and Allied countries, where notes are constantly compared on matters of common interest; the second type of visit is in direct response to an invitation from a foreign air force for the CFS to examine their flying instruction organisation and in most cases, play an advisory role. In the majority of instances the countries concerned comprise the developing nations and in recent years Examining Wing pilots have visited Africa and Asia on several occasions, and have had the opportunity of flying the host country's aircraft, which has included some very interesting types indeed! Happily the excellent reputation of both the RAF and the CFS endures in many parts of the world and there is no diminution in either the number of invitations received, nor of requests to visit the oldest military flying school in the world (CFS was established at Upavon in 1912), and which few would argue is still the best.

Yet another facet of CFS Examining Wing is its pursuit of research and development of those subjects which may shape future flying instruction, and among current studies the CO cited pilot navigation standards, and the preparation of pre-flight ground reference cards for pilots. Potentially one of the most important projects, however, is the investigation into the 'predictability of success', the objective being to accurately identify and assess prospective aircrews' performance at the earliest possible stage. This is an MoD-sponsored project, with the CFS assuming the role of a consultancy. Although the actual number of aircrew who fail to successfully complete their flying training is small, it still represents an unacceptable waste in valuable instructional time, especially when it is realised that it takes almost three years to produce an operational fast jet pilot, quite apart from the million pounds!

Two hours after my dialogue with Examining Wing my own 'predictability of success' was put to the test 9,500 feet above North Yorkshire!

The primary purpose of the sortie was to enable me to take some air-to-air photographs with which to illustrate this article, so I was somewhat surprised when my pilot, Fl Lt Mike Johnson, suggested that during the second half of the sortie he should teach me the rudiments of flying! With the aid of a model aeroplane crudely fashioned from metal but possessing the basic flying controls, and a blackboard in the briefing room Mike elected to give me two basic exercises — to learn the primary effects of the aircraft's controls, and to fly the aircraft at a specific height on a specific heading. During the former he would demonstrate, and I would experience, the effects of elevator (pitch), ailerons (left or right roll), and rudder (yaw). Mike would also teach me some other basic airmanship, such as keeping a lookout, and selecting and holding the aircraft's attitude in flight. After being acquainted with the 'vital actions' necessary in the event of the need to use the ejection seat, I was introduced to the CO of No 2 Squadron, CFS, Sq Ldr Eddie Rouse, who would lead our two-ship for the first part of the photographic portion of the sortie. He provided details of diversion airfields (Linton-on-Ouse, and Dishforth), radio frequencies, and met forecasts, which included warnings of electrical storms in the area. After I had obtained my pictures the formation, which had been assigned the somewhat unlikely call-sign 'Bacardi', Eddie would go off to conduct a 'Spinex' for the benefit of his passenger, a young 56 Squadron Phantom pilot who had just flown up with his aircraft from Wattisham. ('Spinex' tests are given by the CFS JP Squadrons to the pilots of fast jet operational types, such as the Phantom, Lightning, Buccaneer, Jaguar, and Harrier since these aircraft are too complex to warrant practice of their spinning characteristics, so their pilots are periodically re-familiarised with the spin in a Jet Provost or Hawk.)

Kitted up in olive green coveralls and bone dome we walked out to XW436/62 our Jet Provost T5A, one of Leeming's fleet of Mk 3A and 5A JPs which are pooled between the CFS and the Refresher Flying Squadron which also resides at this airfield in company with the Bulldogs of the RNEFTS (No 3FTS), and the similarly-equipped Northumbrian University Air Squadron — four veteran Chipmunks on the base are shared between the CFS and No 11 AEF. While Mike carried out the external pre-flight checks I settled into the right-hand ejection seat and was tethered to the aircraft assisted by a more than helpful groundcrewman, without whose aid I would still be there, trying to fathom the labyrinth of green, blue, and ochre strappings!

Start-up was simply and swiftly effected, with Mike pressing the button and watchfully scanning the relevant revolutions and temperature dials as the Viper wound up, thereafter checking the flying controls with verification from the ground crew who swooped underneath and whipped away the chocks in rapid response to Mike's crossed-hands signal. We called up our leader 'Lima 20', who was in a similar state of preparation somewhere down the line of parked JPs to our left. From out of the ether he acknowledged that he too was ready to go, so with a surge of power and a curtsy as Mike tested the brakes, we pulled out on to the taxiway behind '20' and at about 30mph followed him to the end of the runway. While we waited for a succession of JPs and Bulldogs to land or touch-and-go, Mike checked the controls and considerately cautioned me to check that the white 'Doll's eye' was giving me all the oxygen it should, and that my seat straps were tightly adjusted. A moment later, after clearance from the tower we wheeled on to the runway, lined up, and after acknowledging as 'Lima 23' that all was OK with our JP we ran up the engine and on a thumbs-up signal from Eddie, relayed by his Phantom colleague in the right hand seat, released the brakes, rapidly gaining speed. In no time at all Eddie was wallowing gently into the air, just ahead, echelon, port side, tucking up his wheels as we smoothly unstuck and soon eased into a 6 o'clock position beneath his tail so that I could start taking my pictures on the climb-out. Clear of the 'field we headed east towards our first photo target, a well known white horse (nothing to do with Bacardi) at Kilburn amidst the Hambleton Hills, skirting a light aircraft with glider in tow, before turning west, overflying the Army's airfield at Topcliffe whose hard-standing harboured eight or nine Bulldogs to which they are detached daily to ease congestion at Leeming. Ripon soon hove into sight with its abbey and market square subdued by the banks of threatening thunder clouds into which we quickly climbed so that I could capture Eddie's aircraft against the towering cumulus. Spectacular skyscapes, the very essence of flying were here as we cavorted across canyons of cloud before Eddie lazily rolled over on his back, held it there for a long ten seconds of inverted flight as I snapped away until the film was finished, before rolling out and righting his aircraft. After an exchange of R/T he peeled away to starboard, 'Bacardi' formation dissolving in the process, while we wended our way through the cloud banks towards the North Sea at 350kts and I began my lessons.

First Mike would demonstrate and ask me to gently clasp the control stick and follow him through. Effect of elevators — stick forward a modicum (an imperceptible 1/8") and the nose dipped against the horizon of distant cloud layer; back an eighth into the level (or 'neutral') position, then ease the stick backwards and up the nose, pause, and forward again to set the aircraft level. 'Now you try', Mike invited, 'You have control.' Gingerly I eased the stick forward until the nose dipped, then brought the aircraft back to the level, before pulling her nose up and then down again to set our ship on a level keel. Mike then showed what happened with a more definite stick movement — a sudden whole inch forward, and as the nose dropped the slightly sickening sensation in my stomach told me I was 'enjoying' negative G. Back again to level flight then up (not nearly so bad). My turn now. Stick forward an inch quickly, self-induced-sickening sensation, then back to level flight before a quick nose up, and recovery. Not too bad. Now the effect of the ailerons and I discovered these controls to be just as sensitive as the elevator; a minute movement of the stick to left or right produced a definite rolling effect to port or starboard, as witness the cloud layer way out over the North Sea.

Mike went on to show me the effect of trimming the ailerons and then put the aircraft out of trim to see how I coped. I soon discovered that it decreed delicacy of touch on the tiller wheel, situated between our seats, to settle our ship straight and level. The rudder trim tab was less sensitive, while the rudder itself required all one's physical strength to make any impression, and in fact the rudder is seldom used in the JP, except as a footrest.

Having shown me the basics of flying Mike enquired how I felt about aeros. Nine years out of practice is a long time, so I was cautious in my reply! Suffice to say that we looped above Scarborough, sun sparkling on its sullen grey sea, and I felt those missing years! The barrel roll which followed wasn't nearly so hairy, even enjoyable. I vaguely recalled that when last

Right: Jet Provost T5A, XW320, seconds after unsticking from RAF Leeming's runway at the start of the author's sortie and . . .

Below: . . . another view of the aircraft as it banks over typical countryside of N Yorkshire — wooded river valleys, forests, moorland and arable farmland.

Right: 'Bacardi' Leader's Jet Provost T5A slips between the towering banks of cumulus cloud, 10,000ft above N Yorkshire.

I'd experienced such manoeuvres I had had the benefit of an anti-G suit, whereas in the JP I had not. It makes a difference! Time to get back, so we headed west through heavy rain showers which quite obscured forward vision, gradually letting down to Leeming, Mike showing me the effectiveness of the airbrakes in the process. Soon we're calling up the tower and slipping through the clouds into the circuit which is full of Bulldogs. Mike drops 'Lima 23' on to the downwind leg, the horizon tilts in 35° bank as we turn in towards the runway with its preceding pattern of its twinkling yellow approach lights, while beneath us on the A1 trunk road traffic is teeming. Marvellously as the world levels out, so the runway floats easily up to meet us, awash with water, a JP ahead of us already accelerating into a roller, its progress marked by a wake from its mainwheels. A slight jolt signifies that we've made watery contact with the tarmac, but the rumbling beneath my seat soon subsides as Mike pushes forward on the throttle, eases back on the stick, and soars into the sky, smartly lifting up the gear and hauling our JP into a steep banking climb, complete with attendant G. Levelling out in the downwind leg Mike calmly hands over control, telling me to 'aim for the numbers' when we turn on to finals. My adrenalin surges as the full impact of what he has just imparted strikes home, but mutely I comply and much to my surprise find that it's not so difficult as it looked. I steer for the numbers — '24' large and white on the end of Leeming's runway, but because I'm not plumb with the centre line Mike gently (and wisely) wrests control at about 100 feet and eases XW 436 into another roller. Our fuel state decrees but one last landing and Mike again lets me have a go; a little better into finals, but I seesaw too much to left and right of the centre-line; and Mike again takes over just before we flare out on to the runway. This time we stay down. We have been airborne 1hr 15min and I have enjoyed (almost) every second! Mike brakes and we pull off on to the taxiway, halting to complete our postlanding checks, and to stow the ejection seat safety pins. Opening the canopy a trifle to allow a welcome breath of fresh air, Mike provides the 'gen' on the differential (toe) braking which is the means by which the JP is steered on the ground, enabling me to taxi (slightly zig-zag) back to the hardstand where he again takes control, and turns 'Lima 23' tightly into the long line of parked JPs — everyone has to be home early this afternoon, because at 16.00hrs Leeming's normal flying programme is prematurely concluded to allow an Andover of No 115 Squadron to calibrate the radar and navigational aids of this master diversion airfield.

After thanking Mike for his tuition, patience, and understanding I am just in time to see the tail end of a flying display in front of the Officers' Mess provided by the Meteor T7 and Vampire T11 of the resident CFS 'Vintage Pair', rehearsing their show for the following week's visit by HM the Queen Mother, who is Commandant-in-Chief of the CFS. The Meteor was flown by my principal host of the day, Sqn Ldr Bruce McDonald, a founder member of the team when it formed in May 1972. Since then it has donated the original Meteor 7, WA669, to Brawdy, and now flies the longer life WF791 and the original Vampire, XH304. Each have now more than 2,500hr on their airframes, to which total 60 hour a year are allowed to be added. It is a remarkable achievement that despite the imposition of this limit to eke out their flying hours the Pair manages to perform at 60 displays from May to September each year, although it restricts them to the UK. There are restrictions to their repertoire, too, to prevent over-stressing these precious aircraft, though this in no way inhibits the glue-tight formation keeping which is now a hallmark of much of their show. Thankfully spare parts, including engines, aren't lacking at present, and this situation at least with regard to the Meteor should not deteriorate for a very long time. The 'VP' (maybe it should be VIP?) pilots wear grey flying suits and yellow bone domes for air shows, complementing the finish of their aircraft which is a gloss grey polyurethane paint — infinitely more durable than the authentic silver scheme of RAF trainers in the '1950's, although the yellow 'training' bands of that era are retained on these two survivors of those halcyon years.

Bruce McDonald's association with the Meteor began in 1949 when he flew F4s and T7s at No 205 AFS, Middleton-St-George, after receiving his wings at No 2FTS South Cerney where he learnt to fly on the Prentice and Harvard. His first operational posting followed in 1950 to No 66 Squadron at Linton-on-Ouse, just changing from Meteor 4s to F8s. He was a member of No 66's six-ship aerobatic team, and it was a particular pleasure for me to meet one of my hitherto-anonymous 'heroes' who had provided the highlight of Acklington's Battle of Britain display in September 1951. Bruce was still with No 66 when in January 1954 it became the first squadron in Fighter Command to re-equip with the swept-wing transonic F-86E Sabre. After a year in Kenya flying armed Harvards against the Mau Mau, Bruce completed the CFS course in 1956 and since then has flown a bewildering number of aircraft types in Britain and overseas, amassing more than 8,000 flying hours in the process, most of them on single-seat fighters. Inevitably I had to ask which was his favourite? Without hesitation he cited the BAC Lightning, though confessed almost comparable fondness for the Sabre and the Jaguar.

In addition to flying the Vintage Pair Meteor, Bruce is also an examiner for the type, which explains how he managed to fly the final four machines of this breed in the space of a week, when he checked out pilots of Brawdy's T7 and F8, and Llanbedr's T7 — just part of CFS Examining Wing's work!

Acknowledgement
I wish to express my appreciation to everyone at Leeming and HQ RAF Support Command who made my visit possible and so enjoyable.

Britannia's build-up to the Boeing 767

Martin Horseman

Above: From 1984 onwards, Britannia's fleet of aircraft will comprise two Boeing types — represented by these models of the B767 (top) and B737 (bottom). Twenty-six B737s are currently owned by the airline.
Photo courtesy Britannia Airways

'A MEMBER of the House of Lords said earlier this year that not one airline in Europe was making a profit. If he had said mainland Europe he might have had a point. The whole of our operation is profitable, and these profits have been growing consistently. We have the biggest fleet of Boeing 737-200s in Europe, and it is increasing continuously. We were the first European airline to opt for the Boeing 767 and we now have orders and options on five of these new wide-body airliners.'

In these buoyant terms Britannia Airways' current situation and future prospects were highlighted recently by the airline's managing director, Derek Davison. He pointed to the company's substantial share of the UK inclusive tour charter market as an indication of the success of its operations, and forecast that it would be well placed to benefit further from the primary impetus behind the growth of air travel.

'In 1980 Britannia carried 3.6 million passengers mainly on package holidays, from 22 UK airports to some 65 holiday destinations,' said Mr Davison. 'This represented a 37.5% slice of the inclusive tour charter market compared with our 35.6% share in 1979. Where once leisure travel was a negligible part of civil aviation, today it dominates the air transport market. No less than 70% of all European air travellers now fly for "leisure" reasons and I quite confidently predict that by 1990 that figure will have risen to 90%.'

This huge increase in leisure travel by air — less than 30 years ago it had accounted for only about 10% of total passenger traffic — was attributed by Mr Davison to the industry's achievement in reducing the price of air travel by a very thorough employment of capital assets; 'In Britannia's case our Boeing 737 utilisation of 11hrs/day is the highest in the world.'

Notwithstanding the extensive flying programme and the high load factors the independent airlines in Europe, like Britannia, presently account for only 52% of the total passenger/km flown within Europe. Moreover, the development of the leisure traffic at the forefront of the business interests of these independent carriers is being hampered by restrictions which the Britannia chief executive claims are designed to protect government-owned airlines — the 'national carriers' — from competition. 'The leisure passenger is not paying a high fare — he has been "deregulated" for the past 12 years. But the low fares for airline tourist travellers are part of the holiday packages, and the independent airlines are restricted in offering the increasingly sophisticated leisure travellers what they want — a seat and then the freedom to organise their own holiday at the destination.'

Britannia is advocating a liberalised, flexible low fare structure in Europe that would allow the independent airlines to compete more strongly with the scheduled carriers in pursuit of the leisure sector business; and a plan to this effect is the basis of a UK Dept of Trade recommendation being considered by the European Civil Aviation Conference.

The airline's proposals were incorporated in an August 1979 application to the CAA to be allowed to sell up to half the seats in their aircraft without linking them to a package arrangement. This would give passengers the ability to choose any length of holiday, to fly to one destination and return from another if they so chose, and to avoid being tied to accommodation. As a means of ensuring the occupation of any seats not utilised by package tour operators this scheme, says the airline, would also help to maintain cheaper air fares. But sensing that the constraints are of a short term nature, Britannia is constantly planning for expansion in the market. 'The growth in UK air traffic for leisure reasons is sure to continue and government bodies, airport authorities, anyone who has a say in civil aviation and the growth of leisure traffic, should now be seriously planning for a future when almost all air journeys are made for a leisure purpose', says Mr Davison.

This year the Luton-based airline will be flying five more aircraft than in 1980. Three more Boeing 737s have been acquired since last summer, bringing the fleet total to 26, and a further two 737s will be leased from Eagle Air and Transavia for the 1981 peak season. With three new 737s ordered from Boeing, Britannia's fleet will total 29 by the spring of 1982 and the airline is currently looking at its needs for 1983. To improve fuel economy and performance, Britannia is fitting Lear Ziegler performance data computers to every 737 in its fleet, becoming the first airline to do so. This equipment should produce fuel consumption savings of better than 2% in 1981, this percentage reducing the fuel bill by approximately £1million.

Britannia Airways passengers are presently flown over an average sector length of 1,050nm, a distance which has extended by about 40% in the last eight years and which encompasses nearby destinations in Europe as well as locations further afield, eg in the eastern Mediterranean. With the advent of the 2,600nm range Boeing 767*,

*Roll-out of the first 767 is expected in August 1981 and the type should make its maiden flight the following month.

however, the average length of the airline's flights is set for a major stretch. The new aircraft will be capable of reaching all Mediterranean and West African destinations non-stop from the UK, and of flying to points in East Africa with only one stop. Britannia has two Boeing 767s on order for delivery in the spring of 1984, and options on three more for delivery in 1985 1986.

Among the many considerations involved in the choice of the 767 were the fuel economy, reduced maintenance costs, better passenger appeal, improved airfield performance and enhanced range of the aircraft — all factors which would support Britannia's drive to maintain its competitiveness. As one of the airline's executives summarised the 767's 'get up and go' — 'with this aircraft we can climb straight to 41,000ft after a max weight take-off from Luton'.

Britannia has opted for a 265 passenger capacity in its 767s, and it was the first airline to select the high density version — more doors, strengthened main deck floor, revised cabin layout — also later chosen by Braathens SAFE. Eight abreast seating will give 2+4+2 arrangement on the twin aisle configuration, and the majority of the seats will offer a 31in pitch. The galleys will be located at the front and rear of the accommodation (the main galley aft) with all the toilets at centre cabin except for one at the forward end.

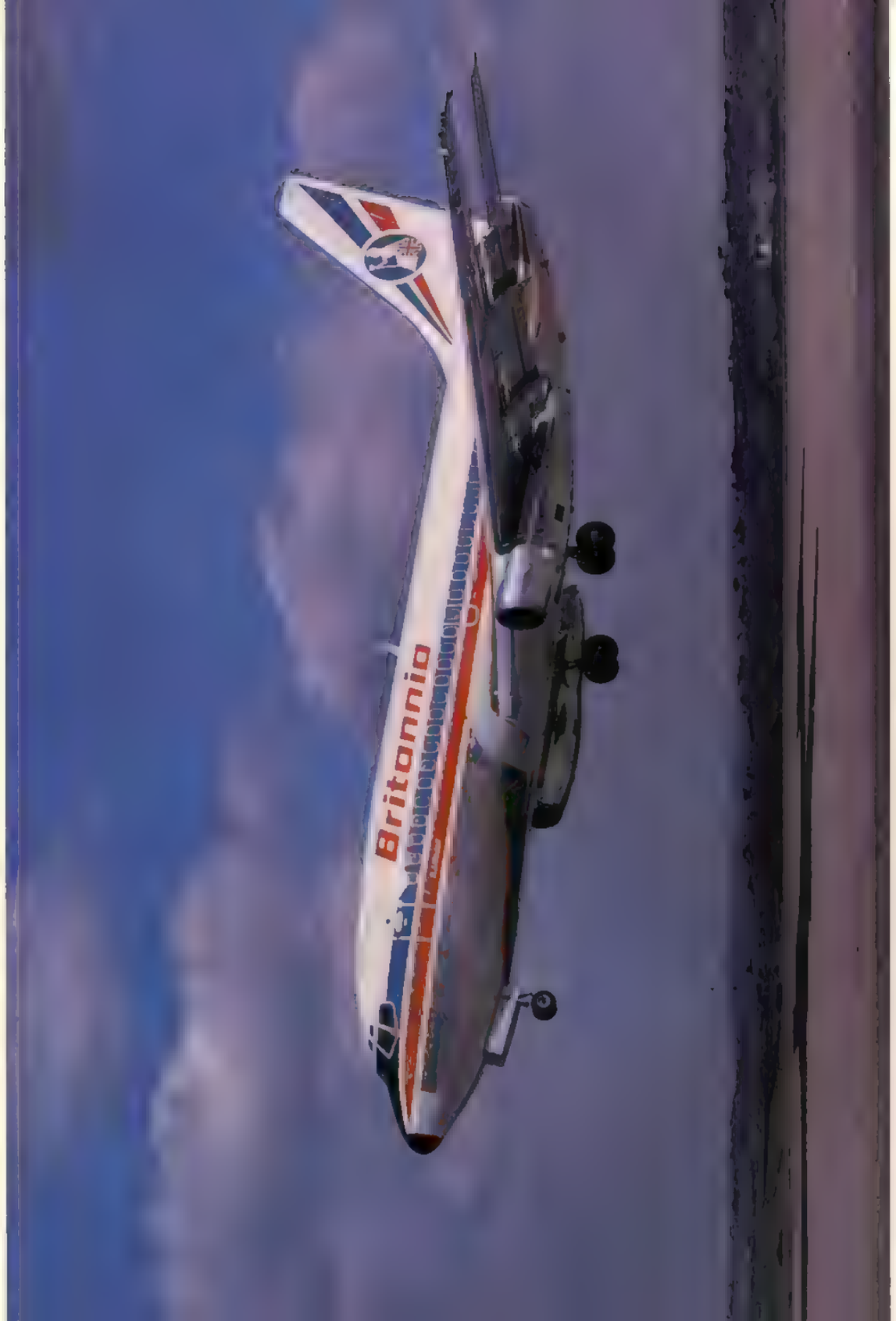
At maximum, the number of seats could have been increased to 290 but this would have involved the retention of only minimum galley facilities. So far as the flight deck 'seating' is concerned Britannia has confirmed that its decision is for a two pilot cockpit.

The customer complement of the Boeing 767 will be just over double that of the 130 seat Boeing 737 so with the new aircraft representing, in effect, 10 more 737s Britannia is projecting its fleet size by 1986 at the equivalent of 42 737s, this implying the acquisition of three more of the smaller twinjets between 1983-1986. The first year of operations with the 767, 1984, is expected to see the aircraft rostered on the routes where the airline has more than five 737 flights per week, for example, to Tenerife, Malaga, Alicante, Palma, Corfu, Athens, etc, from departure points such as Luton, Gatwick, Manchester, Glasgow and — perhaps in 1985 — Birmingham.

Above: One of the most recently delivered Britannia Boeing 737s is G-BHWE *Sir Sydney Camm*, seen here in October 1980.

Below: A night view of Britannia Boeing 737, G-BGYJ *Sir Barnes Wallis* at Leeds/Bradford Airport on 24 March 1981. The airline is fitting Lear Ziegler performance data computers to its fleet of B737s to improve fuel economy and performance.

Right: Britannia Boeing 737, G-BGYK *R. J. Mitchell*, landing at Leeds/Bradford Airport after a flight from Malaga.
Photos. Colin Addison



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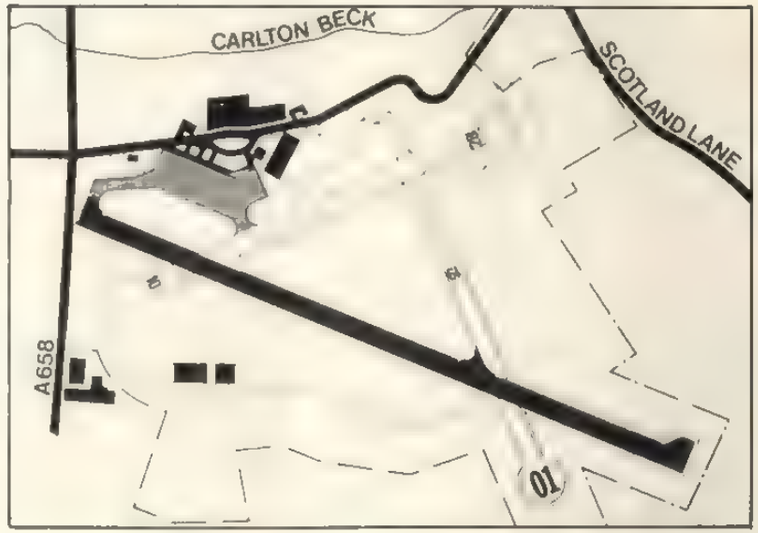
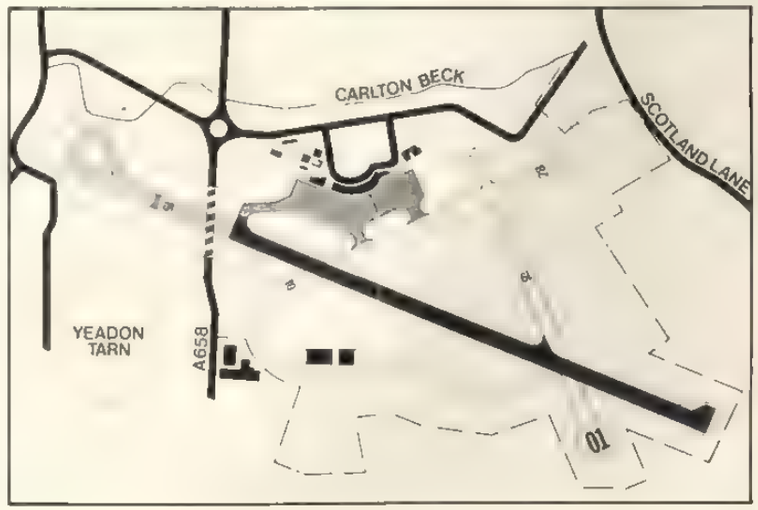
Left: View of the general aviation parking area at Leeds/Bradford, with Beech 95-B58 Baron G-BHFY, Cessna 500 Citation G-JEAN, BAe 125 G-GGAE and BAe Jetstream G-BBYM. *Photo. Colin Addison*

...runway extension

ON 27 JANUARY 1981, Leeds City Council finally decided in support of the runway extension plan proposed for Leeds/Bradford Airport, and thereby joined with its two partner councils in the airport authority — Bradford Metropolitan Council and West Yorkshire County Council — in approving the scheme which had already secured the assent of the government in December 1980 (see *Aircraft Illustrated*, March 1981, pages 123-125). Work is due to begin by mid-1982 and will involve a 2,000ft (604m) extension of the main runway to the northwest, increasing its length to 7,400ft (2,250m). A turning loop and overrun will be provided beyond the runway 15 threshold, and additional elements of the project include full Calvert lighting systems on the runway approaches plus extra passenger, freight, engineering and apron facilities in the terminal area. It has taken 10 years to secure the implementation of the programme, which in its entirity — runway extension, airfield improvements, revision of the surrounding road system — is expected to cost some £25million. Leeds/Bradford Airport marks its 50th anniversary in October this year and it now starts on its second half-century with a future that looks more assured than for many years past.



Below: Plan showing the current layout of Leeds/Bradford Airport with the existing Runway 15/33 running from southeast to northwest — the runway is 1,646m long and 46m wide.

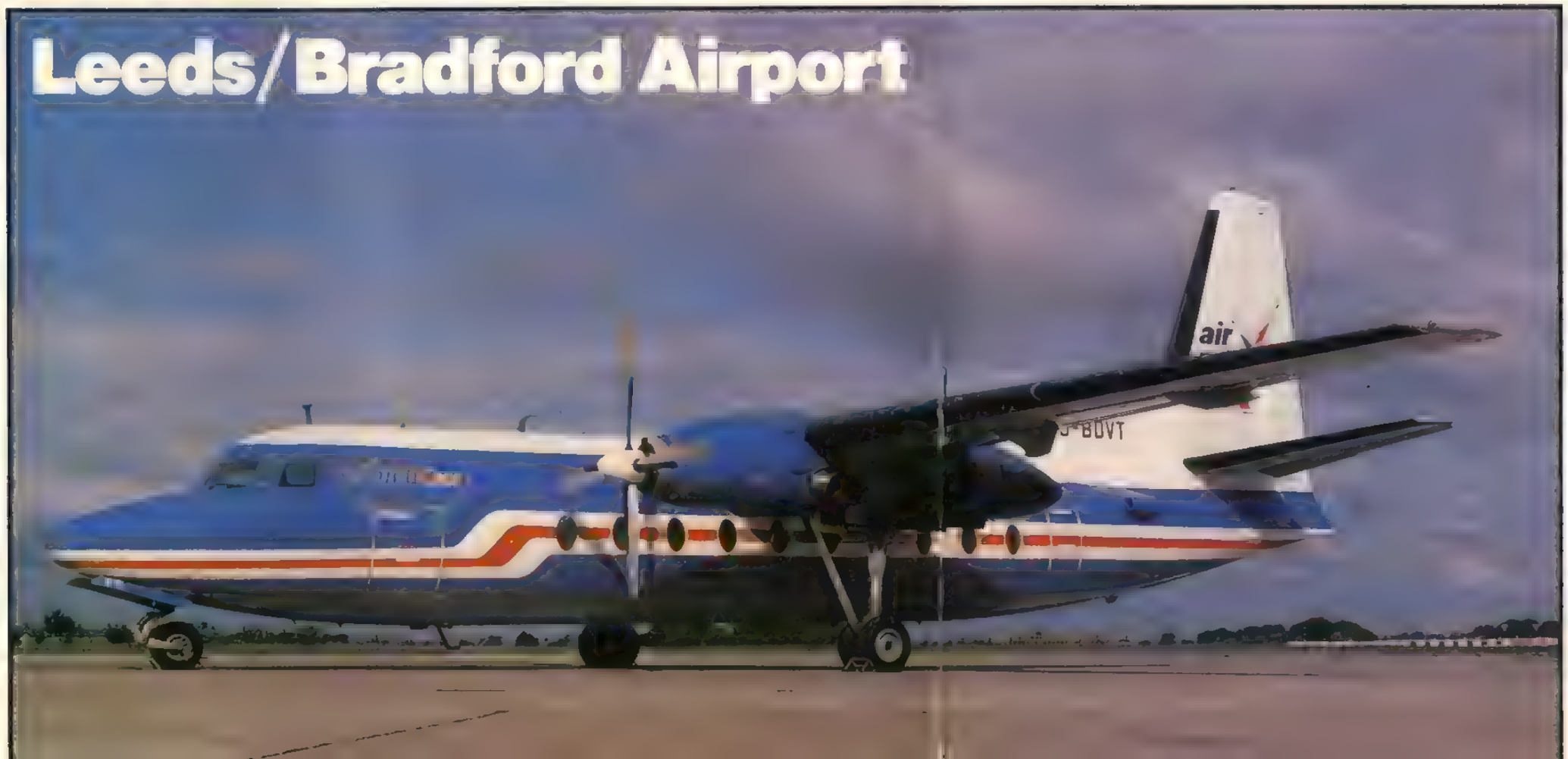


Bottom: By comparison, this plan indicates the approved development of the airport which involves a 604m extension to the main runway at its northwest end and a turning loop plus an overrun area 152m long. Apron facilities will also be enlarged.
Maps courtesy Leeds/Bradford Airport

Aircraft Illustrated at Austicks

Ian Allan Ltd will be holding a display of its publications at Austicks Archway Bookshop, 12 Great George Street, Leeds between 23 May and 6 June 1981. Readers are cordially invited to visit the display and meet the editor of *Aircraft Illustrated*, who will be present on 6 June.

Leeds/Bradford Airport



Photographs by **Colin Addison**

The prospects for scheduled, charter and general aviation operations at Leeds/Bradford Airport were given a major boost on the eve of the airport's 50th anniversary year with the December 1980 announcement of the government approval of the long-standing runway extension plan.

This trio of views illustrates some of the interesting variety of aircraft types which has marked activity at the airport in the past few years.

Above: Barratt Homes Ltd has built a considerable amount of property in the area and the company's Agusta 109A, G-HELY, is a regular visitor to the airport.

Top left: With the terminal building and control tower in the background, a US registered PA30-160C Twin Comanche, N8484Y, stands on the main apron during its stopover.

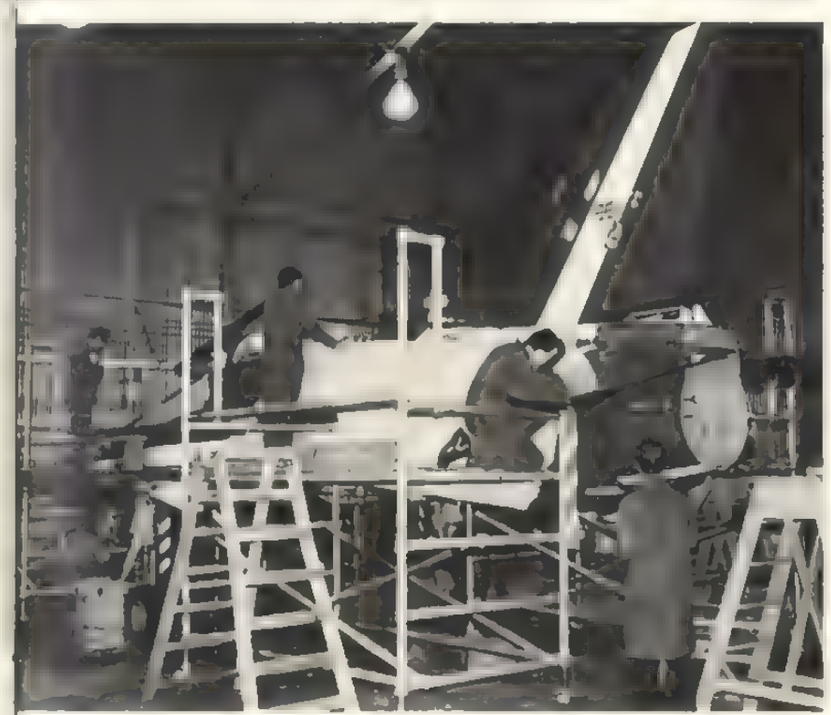
Left: Regular visitors to Leeds/Bradford are the Air UK F27 Friendships operating the airline's scheduled services from the airport — this aircraft is G-BDVT.

Flying with the 'RED ARROWS'

Allan Burney *prefaces a sortie with a description of the pre-flight preparations*

Above left: The new badge of the RAF 'Red Arrows' aerobatic team that carries the motto *Eclat* — brilliance.
Badge via Bill Brookes Aviation Sales

Top: The groundcrew close the canopies of the nine BAe Hawks of the 'Red Arrows' as the team prepare for a practice sortie from their home base at RAF Kemble, Glos.
All photos Allan Burney unless otherwise credited



Above: The brightly-polished Hawks inside the team's hangar at RAF kemble. Basic pre-flight servicing of the aircraft includes replenishment of nitrogen, oxygen, dye for the smoke system and refuelling.

THE DIFFUSE sunlight of early-February enhanced the vivid colour scheme of the nine BAe Hawks as they banked to starboard in uniform precision and with white smoke streaming from their jet-pipes. Some 500ft below, their projected shadows danced across the snaking course of the Severn river and its surrounding countryside, mottled by the dark patches from the clouds overhead. The visual impact of the unfolding scene was impressive, but then so is the entire operation that surrounds the formation in question — the RAF 'Red Arrows' aerobatic team. The occasion was a pre-season practice sortie from the team's home base at RAF Kemble, Glos.

By 09.30hrs that morning the interiors of the 'Red Arrows' two hangars, sited on the perimeter of the airfield, were already the centre of activity as the groundcrews carried out basic pre-flight checks on the aircraft. These included the replenishment of nitrogen, oxygen, dye for the smoke system and refuelling — when necessary the aircraft are also given a general airworthiness check. During the 1980-81 winter period, the Hawks had undergone scheduled servicing encompassing their first 'minor' which was due after 300 flying hrs. This involved fairly extensive de-panelling, close inspection of the air frame and the rectification of any defects — the 'minor' in itself generally lasts for 3-4 weeks/aircraft

While the brightly polished Hawks were being readied for flight, the pilots had assembled in the crewroom to hear the 'met' forecast for the day (10 February). Obviously the weather can dictate the operating schedule of the team as had been witnessed the previous day when the persistent overcast had precluded any opportunity of formation flying. Although an unstable north or northwesterly airflow covered the country, the weather appeared good for Kemble and out to a 40km radius. The forecast indicated '4/8ths cu developing this morning — base 2,500-3,000ft, tops 5,000ft' and an estimated surface visibility of '30-40km but 5,000m in showers'. A surface wind speed of 13kts at 310° was recorded, increasing to 25kts from 330° at 5,000ft. Conditions looked favourable for an intensive day's flying so it was time to get 'kitted-up' and briefed on the sortie.

The flying gear is regulation RAF issue and comprises rather unflattering, but comfortable, long-johns and roll-neck jumper worn under the olive green flying suit. To this attire is added anti-'G' trousers that are designed to combat the rigours of sustained positive 'G' forces by restricting the flow of blood that would otherwise drain to the legs during high-performance manoeuvres. This is achieved by the inflation of a series of air tubes that run through the breeches and its resultant pressure around the lower limbs. With its profusion of clips and fasteners the trousers were secured; although two tightening zips were left undone to aid movement — which was becoming decisively more constrained! Just below the knees were wrapped leg restraint garters* and then the surprisingly heavy and bulky life-saving jacket was slipped on and its belts done-up. Next came the helmet; this was eased over the head and then adjusted to produce a very firm fit. The oxygen mask was clipped on and the support systems of the Personal Equipment Connector (PEC) connected up. The PEC constitutes the pilot's lifeline of oxygen, radio and air for the anti-'G' suit. To ensure that the unit was operating correctly (and that no oxygen was escaping from the sides of the mask now clamped tightly to the face), it was examined on a test rig.

In full flying gear it was then along to the instructional Martin Baker ejection seat for a rehearsal of strapping-in and precautionary 'punching-out' procedures. The latter were run through by the team manager, Sqn Ldr Ray Thilthorpe: 'grip the ejection handle (located at the centre of the front of the seat) with the right hand, left hand over the wrist, head back and pull firmly'. Several interesting asides followed; 'if you hear the command eject, don't say "what" because you'll be talking to yourself. If, after several seconds, you are not dangling on the end of your parachute, it's just not your lucky day'.

Now mid-morning and it was time for pre-flight briefing. The relatively informal briefing and debriefing sessions take on an all important role during the pre-season work-up as the team strives to perfect the new manoeuvres and formations. A good rapport between 'the boss' and the rest of the pilots is essential, and throughout the proceedings ideas are put forward, advice given and, in the case of debriefing, mistakes analysed; the team has its own video cameraman who records each display for playback during the debrief. The video is

*Once in the aircraft, leg restraint straps are fed through metal loops in the garters and in the event of an ejection, the straps become taut and prevent the legs from flailing about and becoming damaged.

Above: The author being run through strapping-in procedures on the instructional Martin-Baker ejection seat. *Photo. Peter R March*

Above right: Front cockpit details in a 'Red Arrows' Hawk; note the three lights at the top right of the console, that indicate to the pilot the smoke colour (red, white or blue) in operation.

Left: An unusual angle on the nine Hawks of the 'Red Arrows' seen during their post-take-off join-up manoeuvre and with smoke streaming from the jet-pipes. Literally seconds after this photograph was taken (from the chase aircraft piloted by Sqn Ldr Ray Thilthorpe) the team was holding close formation in Nine Arrow.

carefully scrutinised and a freeze-frame facility enables the team to study the accuracy of the formations at any one particular moment. The pilots are also encouraged to air any misgivings they may have on the parameters of the flight — for safety is a concurrent factor. Much is learned from the briefs, which are of especial value to the three new pilots for the 1981 season; Flt Lts Henry de Courcier, Iain Huzzard and John Myers, who fly Arrows Nos 4, 8 and 9 respectively.

Scheduled for the second sortie of the day — the team flies up to four practice sessions in one day, weather permitting — the briefing on 10 February allowed for a 10 aircraft departure, with the manager flying the 10th (reserve) Hawk to provide a platform from which to photograph the rest of the team in formation. Brian Hoskins rounded off his briefing with 'any questions? . . . no . . . okay then let's go' and it was out to the aircraft.

The 10 Hawks had been towed out on to the red stained apron (tinted by the dye from the smoke generating system) and arranged in a line-up with such exactness that they resembled a parade rank. On approaching 'Red 10', XX304, the angle of the tandem cockpit design became very apparent. Access is gained from the port side and aided by a built-in step-up rung (extended from the lower part of the fuselage), handholds at the cockpit rim just behind the front ejection seat and a hinged recess for the left boot — the latter foothold attained only after some manual guidance from the ground crew! The right foot was then transferred from the rung on to a black abrasive pad atop the engine air intake and from this rather ungainly position the left foot was swung over into the cockpit. Perched high in the rear seat, the immediate impression was one of spaciousness. The outlook is panoramic, and this is a facet of the Hawk that is surely unrivalled by any of its international counterparts. Like the uncomplicated lines of the airframe, the layout of the cockpit is neat and straightforward. In front the main instrument panel with its central console of compass and artificial horizon and its standard RAF fit of instrumentation. Prominent on the left is the throttle and to the right the radio (with a non-standard UHF fit in addition to the VHF transceiver) and cockpit ventilation controls.

On entering the cockpit the first action was to plug the PEC shoe into place in its console on the left of the seat and to check that it had slotted in correctly. The leg restraint straps were threaded through the corresponding garters and pushed into place either side of the legs in the seat. Welcome assistance was at hand for the major strapping-in as the two main harnesses were brought over the shoulders, fed through the lap harness (negative 'G' straps) and snapped into the main buckle that was positioned around the solar plexus. The straps were tightened, firmly but not painfully, and the lever of the 'go-forward control' was advanced and some of the tension released — the belts worked on an inertia basis, much like those in a car. It was then time to don the helmet with its large red arrow emblazoned across the crown. With the chin straps done up, oxygen mask fitted, RT (radio telephone) and oxygen connections made, it was just left for the occupant's padded-out weight of 75kg to be dialled into the ejection seat

and preparations were complete; but for Ray Thilthorpe (the author's pilot for the sortie) and the rest of the team they had just begun. Before climbing into the front seat, Ray quickly surveyed the back cockpit to ascertain that everything was secure and that a number of control switches were on the right setting. Because the Hawk was designed as an advanced trainer with the instructor in the rear seat, some of the switches override those in the front — so this is a standard procedure for any Hawk pilot flying solo or with a passenger. Several minutes later Ray checked in over the RT to confirm that at least one element of the two visors (one tinted and one clear) was down over the eyes as the large perspex canopy of the Hawk was closed. This was a precaution in case the miniature detonating chord (MDC), which zig-zags along the top of the canopy, was to explode. After the canopy was secured the MDC and ejection seat safety pins were removed and stowed thus making both systems live. The Martin Baker ejection seat has a zero-zero (no height, no speed) capability and the MDC is designed to shatter the perspex of the canopy a fraction before the seat is operated.

The start up procedure of the Hawk's Rolls Royce Adour 151 turbofan and pre-taxi checks were later related by Ray:

'A gas turbine starter produces air under pressure which is fed into the main engine to rotate it — detectable as a faint whine in the cockpit. The main engine revolves to between 15-18% rpm and the hp cock is opened to allow high pressure fuel through to the burners and the engine picks up on its own. At 45%rpm the gas turbine starter should shut down automatically. Once the engine is going a few checks just to make sure that the gas temperature and RPM are within limits and the oil, fuel pressure and fuel transfer warning lights are out. The throttle is opened to 65%rpm (the Adour 151 is rated at 5,340lb) and by doing that a bleed valve on the engine is closed — the valve bleeds off air at a certain point of the compressor to get the right air mix. The main hydraulic system is then started and at that stage the warning panel lights are all out apart from one which is the anti-skid device on the brakes. That is left until pre-take-off checks'.

At this point Brian Hoskin's voice clipped over the RT, 'Reds check' and each pilot reported in. 'Red leader' then called for taxi and the nine Hawks of the Red Arrows (plus one) trailed their leader, at a fairly brisk pace and in pairs down to the end of the runway. A few final pre take-off checks to ensure that the pitot heater was on, the flaps were set to 'mid' and that the anti skid device was switched on. The latter prevents the wheels from locking during excessive braking by bleeding off the pressure. Just prior to take-off and a fairly standard abort brief should an emergency occur: If the undercarriage is still down, stay on the ground. If it is just after lift-off and undercarriage up has not been selected, back down on the ground and try and stop on what runway is left — if this fails take to the barrier. Once airborne with gear-up, gain what height you can depending on what speed you have and eject — trying to point the aircraft away from any houses or built up areas.

The Hawks of the two leading groups of three shimmered in their own jet efflux as the rear section swung off the taxiway and lined-up behind them on the runway. With the team now poised for take-off, the steady yet muffled roar of the Adour engines increased to a more fervent pitch as the throttles were opened and the aircraft momentarily restrained on the toe brakes. Headed by Brian Hoskins, the lead formation began their take-off roll and were shortly followed by the second group in hot pursuit. On cue from the section leader (Flt Lt Tim Watts), the four Hawks bringing up the rear leapt forward as the brakes were released. The runway centre lines flashed past with increasing rapidity as the firm, but not excessive, acceleration built-up to around 120kts. The noses of the Hawks rose in unison and the aircraft climbed steadily out for their normal display routine join-up.

To be continued next month

Top: The team leader Sqn Ldr Brian Hoskins taxies out in Hawk XX257 with the rest of the team poised to follow.

Above: A close vic-three formation of the 'Red Arrows' on take-off is well illustrated in this view of the rear section just after rotation and . . .

Right: . . . climbing steadily out from RAF Kemble for their normal display routine join up.

The 1981 'Red Arrows'

Team position	*Aircraft*	*Pilot*
1	XX257	Sqn Ldr Brian Hoskins
2	XX260	Flt Lt Byron Walters
3	XX266	Flt Lt Wyndham Ward
4	XX253	Flt Lt Henry de Courcier
5	XX259	Flt Lt Neal Wharton
6	XX252	Sqn Ldr Steve Johnson*
7	XX264	Flt Lt Tim Watts*
8	XX251	Flt Lt Iain Huzzard
9	XX227	Flt Lt John Myers
(manager)	XX304	Sqn Ldr Ray Thilthorpe
(spare)	XX306	–

* synchro pair

The 'Red Arrows' organisation

The 'Red Arrows' are equivalent to a standard RAF Squadron whose peacetime role is to demonstrate the qualities and skills demanded of all officers and airmen. Like many training establishments, the entire team would be quickly absorbed into operational squadrons should the situation so require.

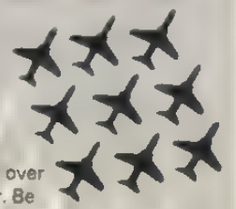
Operating from RAF Kemble near Cirencester, the Red Arrows are a detachment of Central Flying School (CFS) which is commanded by Wg Cdr J. H. W. Black. The team of nine pilots is led by Sqn Ldr Brian Hoskins and completing the team are the manager, Sqn Ldr Ray Thilthorpe and the Junior Engineering Officer. Administration for the detachment is run by the Adjutant and five supporting staff. Away from base, the 'Red Arrows' are supported by 27 travelling groundcrew while the Senior Engineering Officer and a further 50 Technicians remain at RAF Kemble to service the aircraft on their return.

Preparation of the 'Red Arrows' display year begins in June when selection of new pilots for the following year takes place. Normally three per year are posted from the team and replacement pilots can expect to remain for three years before returning to the front-line. New pilots arrive at RAF Kemble during the late summer just as the display season is coming to an end, and start formation flying practice. Most training is carried out at RAF Kemble and advantage is occasionally taken of good weather at other airfields. The team flies up to four sorties a day, initially with small formations of aircraft, gradually building up to nine. On completion of the intensive training period, which is normally the end of March, the display sequence is watched by the Commander-in-Chief Support Command who must give his approval before the 'Red Arrows' can display to the public

Planning for the first display begins about six weeks before the event when logistic requirements are sent to display organisers and operating airfields. The latter are ranked according to importance — for example a show such as Farnborough is rated as AA, whereas the vicar's garden fete would be DD! A close liaison must be maintained over the following weeks until some 10 days before each display when a detailed military operation order is issued.

Normally, on the day of departure for a display the transport support aircraft arrives at RAF Kemble in time for loading spares, servicing equipment and personal kit. This aircraft, usually a Hercules, also carries 18 groundcrew and follows the 'Red Arrows' wherever they go. Ten aircraft are flown to each operating airfield; known as the 'flying circus', the Engineering Officer and nine groundcrew members fly in the rear seat of the Hawk for transit flights so that servicing can begin before the support aircraft arrives. Prior to display, the team is briefed by the Leader who has to decide which type of sequence to fly according to the prevailing weather conditions .Whenever possible a commentary is provided by the manager.

Join the Red Arrows Fan Club



The internationally known aerobatic display team THE RED ARROWS are appearing all over Britain and Europe this Summer. Be there as a member of the Red Arrows Fan Club. Members receive a superb full colour action poster, a metal badge with authentic insignia colours, exclusive membership card, full datesheet for the season, and regular illustrated newsletter

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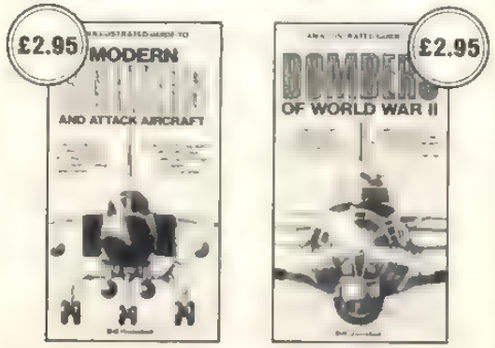

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Gloster Gauntlet rebuild in Finland

Bob Ogden
provides a postscript to our recent Gauntlet article†

ALTHOUGH THE withdrawal from service of the Gauntlet in Finland in 1945 marked the end of the operational life of the type, a new chapter has been taking place over the last few years. In 1981 it is hoped that the last remaining example of this famous fighter will again take to the air.

The story started on 26 March 1936 when aircraft K5271, c/n G5/35957, was delivered to Martlesham Heath: the original plate was on the fuselage when the remains were discovered. The Gauntlet returned to Glosters on 4 May 1937 before being delivered to No 19 MU on 4 August 1939. In November 1939 the Soviet Union attacked the occupied parts of Finland and the Finnish Air Force was short of aircraft. Twenty five Gauntlets were delivered to Finland and these were a gift of the South African Government. They were shipped in crates to Gothenburg in Sweden and arrived too late to serve in the Winter War although two were flown to Finland three days before the armistice. By the time all the Gauntlets were ready for service more modern aircraft were available and the type was used for fighter training. Ten aircraft survived up to 1945 and were placed in storage in February of that year, but it was not until 1950 that they were sold for scrap. Upon investigation of Finnish Air Force records it was found that K5271 had been allocated the Finnish serial GT 400.

I visited Finland for the first time in 1976 and in correspondence with Eino Ritaranta before my trip I was told about the discovery of the Gauntlet. Apparently rumours of the survival of a Gloster fighter had been rife since the early 1970s. Eventually Eino met Alpo Hintikka — a vintage car restorer who has taken part in the Brighton run — who had seen the remains of the aircraft in a scrap yard near Juupajoki, about 50 miles north of Tampere. Mr Hintikka did not initially divulge the location of the components but by 1975 he managed to acquire them and they were transported to his farm. In late-1975 Eino inspected the remains and they were identified as those of a Gauntlet. They had been outside since 1950 and consisted of the basic structure of the fuselage, wings and tail surfaces. The undercarriage and instrument panel were missing and only one cylinder remained on the badly corroded crankcase of the Bristol Mercury engine.

Top: A line-up of Gloster Gauntlets in summer-1941 with East Front markings just painted on. In all 25 Gauntlets were delivered to the Finnish Air Force as a gift of the South African Government.
Photo via Eino Ritaranta

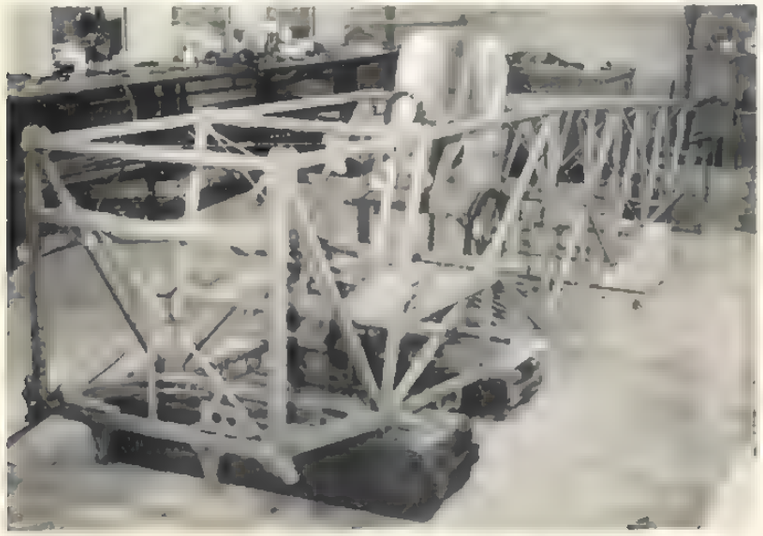
Above: Gauntlet GT-400 in service during the Continuation War period.
Photo via Kalevi Eskonmaa

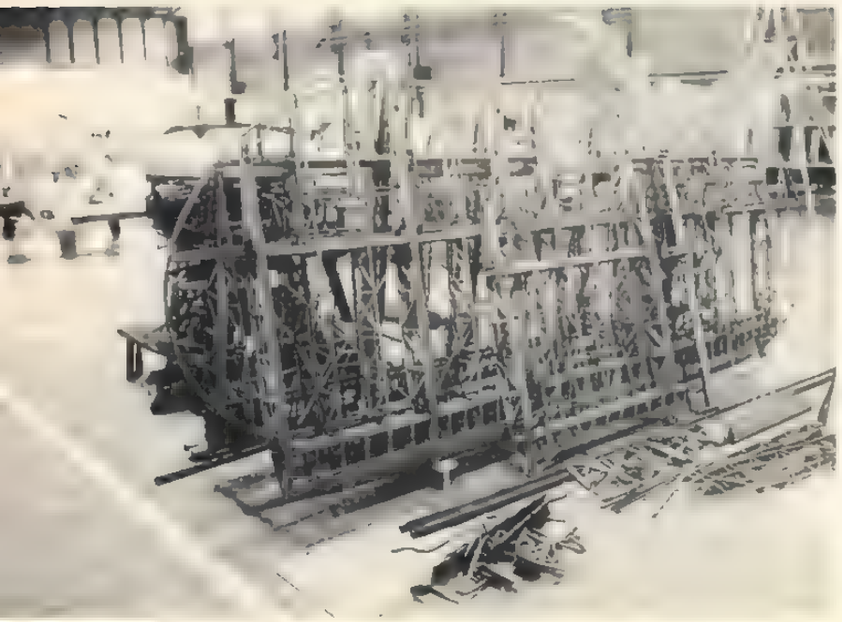
† 'The Gloster Gauntlet story' by Kenneth E. Wixey *Aircraft Illustrated*, January 1981, pages 13-17

Right: The remains of GT-400 at Alpo Hintikka's farm at Kuorevesi in November 1975; this photograph indicates the scale of the restoration project undertaken by Kalevi Eskonmaa and his team. *Photo: I. Ritaranta*

Below: Undergoing restoration at Halli AFB in August 1977 were the fuselage frame . . .

Bottom: . . . and wings of Gloster Gauntlet GT-400. *Photos: Eino Ritaranta*





In August 1976 my wife and I met Eino at Halli Air Force Base along with Matti Pirsila of Valmet OY and WO Kalevi Eskonmaa an instructor at the Finnish Air Force Technical School at the base. It was with great enthusiasm and expectation that we followed two Finnish owned Volkswagens at high speed over dirt roads into the forest. After about half an hour we arrived at a farm in a clearing and were introduced to Alpo Hintikka who then took us into a barn to see his acquisition. Although some specialists had previously decided that the airframe was in too bad a condition for restoration, Kalevi Eskonmaa — with previous experience of rebuilding a Focke Wulf Stieglitz, an Auster 4 and a Callair agricultural aircraft — was not of the same opinion. He took samples of the tube for X-ray analysis and as a result of these tests came to the conclusion that the Gauntlet could be restored to flying condition. Later in the afternoon another car dash was made to the scrap yard where the remains had been found and among the bushes were discovered more Gauntlet wings and other parts of a second aircraft. The remaining aeronautical items here were a few Gladiator components plus several Fokker CX and VL Myrsky II airframes.

The Gauntlet components were purchased in late-1976 by the *Lentotekniikan Kilta* (Aviation Technical Guild) whose members are past and present Air Force personnel. The restoration started in that year under the direction of Kalevi Eskonmaa. In August 1980 I made a second visit to Halli and was amazed at the progress which had been accomplished over the previous four years. In the rear of the hangar of the Air Force Technical School was the Gauntlet, surrounded by MiG-21s, Fouga Magisters, Saab Drakens and Saab Safir instructional airframes. The fuselage was standing on its newly manufactured undercarriage and was resplendent in the colours of the Continuation War period. In a rack close by were the wings, covered in fabric and only awaiting the application of the final camouflage coats and the national markings. Close inspection revealed the exceptional standard of workmanship and it was nostalgic to sit in the cockpit of this famous type. The hours spent on the rebuild since 1976 amounted to about 7,000 of which approximately 6,000 have been put in personally by Kalevi Eskonmaa in his spare time.

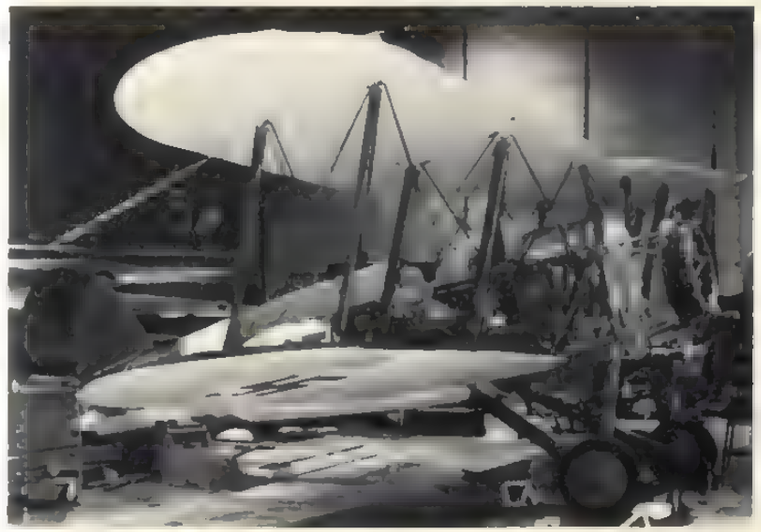
The original plans were to have the Gauntlet airworthy for an air display at Halli on 3 August 1980 to mark the opening of the new museum of the Aviation Technical Guild. However, as any rebuilder will know, outside factors have a considerable effect and delays have occurred. Nevertheless the fuselage was placed on static display and it is hoped that the first flight after rebuild will be later this year. Lack of a suitable Mercury engine has meant that an Alvis Leonides 127 engine will be fitted, this having been taken from one of the Percival Pembrokes recently withdrawn from service in Finland. Although the dimensions of the two engines are similar the Leonides is lighter than the Mercury and this has involved the redesign of the front fuselage which will slightly interfere with the lines of the aircraft. Final work to be carried out prior to assembly includes the fitting of the engine and instruments and the delivery of a new set of flying wires* from the original manufacturers in Scotland.

Although there is bound to be controversy as to whether such an historic aircraft should fly, I am a firm believer that wherever possible an aircraft should be rebuilt to flying condition. One only has to visit Old Warden, Ferte Alais or displays in the US to fully appreciate vintage aircraft in their natural environment. The accident risk is surely outweighed by the enormous pleasure brought to thousands at air displays and rallies.

For the biplane enthusiast Halli also has other gems to offer. In one of the hangars is the sole remaining airworthy Steiglitz in Finnish Air Force use, serialled SZ-4, which performed aerobatics at the Halli show. The Technical Guild has for several years run a small museum in a wooden hut at the base and several other vintage types have been in store. On 3 August last year their new museum opened with a comprehensive display of components, photographs and documents in two buildings and also a hangar workshop. In the latter is the sole remaining Bristol Bulldog IV, BU 59 c/n 7810, which is under restoration to static condition. In many ways it is regrettable that one has to travel such a distance to see these surviving examples of two famous British fighters but the Finnish authorities are to be congratulated on their preservation policies.

*These arrived in November 1980 and the fitting of the wings began shortly afterwards.

Acknowledgement
The author would like to thank all persons mentioned in the text for their help over the years and the Finnish Air Force at Halli for allowing access to restricted areas.



Above: The Gauntlet's restoration progresses as the fuselage shape begins to take form and markings are applied.

Left: With wings attached restoration nears completion — the result of over 7,000hr of work. The high-quality of workmanship is evident in this view. *Photos: R. E. Ogden*

SHAPING-UP!

Peter R. March

Below: The Osram lightbulb, G-BEWS, is a balloon design that now seems more straight-forward compared to subsequent shapes that have been produced . . .

Right: . . . such as the Cameron Mr Planter Peanut, G-PNUT. The balloon is seen here as it took to the air for the first time in the Avon Gorge, Bristol.

UP AND down the country at fetes, garden parties, sporting events, agricultural shows and a hundred-and-one similar activities you will be sure to see the ever popular hot air balloon climbing sedately skywards. That is, of course, provided that the weather keeps calm and there are not too many thermals or storm clouds about. As the only legal form of aerial advertising a great deal of company sponsorship is now going into the purchase and display of these Cameron, Colt and Thunder balloons. Spurred on by this commercial interest the manufacturers have responded to the calls from sponsors for more and more exotic platforms on which to carry their brand-name.

It started several years ago with the famous Cameron Champion Spark Plug, G BETF, and Golliwog, G-OLLI, for Robertsons Jams and has been followed by a host of odder and odder shapes such as the unwieldy Wrangler Jeans, G-BREN, Osram Lightbulb, G-BEWS, and Mr Peanut, G-PNUT, the latter being complete with hat and walking stick. More recently Colt has produced such monsters as Buzby Bird, G-BZBY, Gas Flame, G-BGOO, and Ricard Bottle, G-BHKL.

Another innovation from the Cameron drawing board was the first hot air airship Zanussi, G-BEPZ. This two-man powered craft had the great advantage that it could be controlled (that is a relative term) once in the air and 'flown' around in front of the audience. A second, smaller airship was introduced earlier this year, the first example, G-CULT, having been sold to Colt Cars for some £20,000.

Nothing now seems to be stopping the balloon manufacturers; if you want a particular shaped object to fly, and you have the money to pay for it — they will build it. The Nottingham Building Society wanted to get a house airborne so Don Cameron and his colleagues at Bristol built them one, a beautiful thatched cottage, G-COTT. Paint can, beer mug, cigarette packet and various shaped bottles have all taken to the air. And there are plenty more to come . . . look out for Fozzie Bear, a hamburger and a human head shaped balloon during the coming months. At least this is one flourishing section of the British aerospace industry — and thats' not just a lot of hot air. What a shape to be in!

Left: Unusual shapes at the Bristol Balloon Fiesta in September 1980; from left to right Colt Buzby (G-BZBY), Colt Ricard Bottle (G-BHKL), the more conventional Thunder Ax6-56Z balloon of Lambert & Butler (G-BGVR) and Colt Gas Flame (G-BGOO).
All photos: Peter R March

Below: One of the first and most distinctive shapes to appear on the ballooning scene was Cameron's Golliwog, G-OLLI.

Below right: The unwieldy Cameron Wrangler Jeans, G-BREN, and Cameron Zanussi Airship, G-BEPZ, at Marsh Benham near Newbury.

Above: The North American F-86F Sabre is the subject of a new model from ESCI; five of the type formerly operated by the RNorAF are seen here carrying the 'AH' squadron codes and fin-shields of *332 Skvadron*. *Photo RNorAF*

airkits

James Goulding

Two Sabres

ESCI has marketed two excellent kits of the North American F 86 Sabre, which use the same moulds but have different markings. The kits represent the F-86F (the box refers to the F-86E, but the subjects are F-86Fs) and the Canadair CL-13 Mks 4 & 6.

The basic model has a good outline shape, capturing the character of the Sabre. The wing of the Sabre seems simple compared with its modern counterparts; it was one of those early fighters influenced by German research into the use of swept wings at transonic speeds. Other aircraft which benefited from this research included the F-84F Thunderstreak, Supermarine 510, Saab J-29 and the MiG-15.

ESCI's model has components designed for ease of change to different versions. The wing can be changed to the folding variety used on the US Navy Fury, or the F 86H or F extended type. The gun port panel on each side of the fuselage is a separate component and this can be changed to four 20mm guns or two 30mm guns (as on the Australian F-86s) instead of the six 0.5in guns included in the present kits. The nose intake could be altered to the deeper type used on the Avon-powered Australian versions.

The fuselage on the existing kits has a cut-out and separate component where the arrestor hook would be on the Fury. It is obvious that ESCI can ring the changes to produce a number of Sabre/Fury kit subjects.

Surface engraving on the Sabre is of a very high standard, the skin and panel lines being indented in a very delicate manner. The cockpit has a fine representation of an ejector seat and there are other good features; the windscreen and large canopy, very much a hallmark of the F-86, are fine mouldings. Decals are provided for the instrument panel and side consoles. Modellers may wonder why both the fuselages of the F 86F and Canadair CL-13 have small cut outs in the area of the canopy seating, with corresponding parts to be cemented into these cut-outs. At first sight these appear to be pointless, but they are for use with a future FJ-2/3 Fury kit. The Fury had a revised canopy design, which seats down into the fuselage cut-outs.

Two long-range tanks are installed, one under each wing and on the outer hard points. The inner pylons on the CL-13 carry Sidewinder air-to-air missiles, but these are omitted on the F-86F. Bomb shackles are included in these kits, but are presumably intended for a future kit.

The undercarriage legs and wheels are nicely detailed and look convincingly functional.

As with all ESCI kits excellent markings sheets are included. The F-86F model features options for three aircraft, the F 86F of Maj James Jabara of the 334th Fighter Interceptor Squadron, USAF in Korea; an F-86F-30 of No 2 Squadron, South African Air Force; and an F 86F of *Esc 131*, of the Spanish AF.

The CL-13 sheet gives markings for four aircraft. These are a Sabre Mk6 of No 439 Squadron, 1st Wing, of the RCAF, a Sabre Mk4 of No 112 Squadron, 2nd Tactical Air Force, RAF; a Sabre Mk6 of the *I Staffel, JG71* 'Richthofen', of the *Luftwaffe* and a Sabre Mk4 of *4° Stormo*, of the Italian Air Force.

On the colour chart for the CL-13 Sabre Mk4/6, the under-surface colour is given as 'Light Grey' but the standard colour used for this mark with Dark Green and Dark Sea Grey upper surfaces was PRU Blue.

These ESCI Sabre kits are excellent products.

New Decals

Hannants of Lowestoft has sent me sample sheets of a new range of decals in 1:72 scale produced by ALS Enterprises of Ottawa, Canada, which are marketed under the name of Flight Colours. Hannants is the sole distributor of these decals in Europe and the UK.

As one might expect Flight Colours has at the present time a strong bias toward Canadian subjects, although aircraft of other countries will also be included on these sheets — as indeed they are on one of the four sample sheets seen so far.

Sheet No 1-72 gives markings for six different Canadair CF-104 Starfighters suitable for any of the Heller, Airfix, Matchbox, Hasegawa/Minicraft or Revell F 104G Starfighter kits. All the aircraft featured are from Canadian Units and are finished in either overall Dark Green, natural metallic or Dark Green/Dark Sea Grey/Light Grey schemes.

Sheet No 2-72 has markings for eight different RCAF Canadair CL-13B Sabre Mk6s. These feature the colourful tail markings of Nos 422(F) 'Tomahawk' Squadron, 427(F) 'Lion' Squadron, 430(F) 'Silver Falcon' Squadron, 434 'Bluenose' Squadron, 439(F) 'Sabre-toothed Tiger' Squadron, 441(F) 'Silver Fox' Squadron and 444(F) 'Cobra' Squadron. All these Sabres are in the standard Dark Green/Dark Sea Grey/PRU Blue scheme. This is a particularly attractive set of markings, which are suitable for the Hasegawa/Minicraft and Heller F-86 kits.

Sheet No 3-72 is a sheet of markings for the Canadair CF-5A single-seat fighter and CF 5D two-seat trainer; Canadian production versions of the Northrop F-5A and the T-38 Talon respectively. Markings are given for CF 5As of Nos 419 'Moose' Squadron, 434 'Bluenose' Squadron, 433 'Porcupine' Squadron and the Aeronautical Engineering Test Establishment, as well as a CF-5D of No 434 'Bluenose' Squadron. Decals are also given for CF-5s of other air forces, including a CF-5A of the RNeths AF, a CF-5D of the RNeths AF and a number of CF 5A and CF 5D aircraft of the Venezualian Air Force.

Sheet No 4-72 has numerous markings for the Canadair T-33AN and CT-133 Silver Stars — Canadian versions of the Lockheed T-33 two seat trainer. The units included on this sheet are the 'Golden Centennaires,' the 'Snowbirds' (No 431 Air Demonstration Squadron), RCAF No 1 Air Division and No 1 CAG.

These sheets are beautifully printed and of very high quality, and it is to be hoped that the series will branch out into more subjects from other countries as planned.

Hannants has also sent three of the latest 1:72 scale Microscale decal sheets. Sheet No 72-277 gives detailed markings for the General Dynamics F-16 single and two-seat aircraft from the Air Forces of Holland, Norway, Belgium and Denmark. Various stencil markings, instrument panels, lines, ejector seat warning triangles and instruction labels are on the sheet.

Sheet No 72-276 gives US markings for the F-16 and features aircraft from No 388 Tactical Fighter Wing. Other markings, as on sheet 72-277, are included.

Sheet No 72 278 is a WW2 sheet featuring Republic Thunderbolts of the USAAF. Markings are given for P-47Ds of the 5th Emergency Rescue Squadron, the 394th Fighter Squadron/367th Fighter Group, and the 84th Fighter Squadron/8th Fighter Group.

At first I was a little taken aback by the rather light blue of the national insignia, instead of the true dark blue. But a note on the instruction chart makes it clear that this is intentional to simulate faded and worn markings. It is a debatable point whether markings produced in a lighter shade, but otherwise unblemished, really look faded and worn, or whether it is better to use markings of the correct shade and then use techniques to produce a chipped, and partially faded, uneven-toned appearance. Personally I prefer the latter system because it looks more authentic — whereas the former can merely give the appearance of markings having been produced in the wrong colour instead of the intended simulation.

Apart from this, the standard of production and printing is extremely good, and some of the stencil markings are minute.

The price of the Flight Colours sheets is **£2.00** per sheet including VAT. There are a lot of aircraft featured on each sheet, but unless one is an avid Starfighter or CF-5 enthusiast it is unlikely that all the markings on each sheet will be used. Sharing the costs and sheet contents between modelling friends can thus be useful and it also enables a modeller to benefit from the contents of several sheets instead of having to put unwanted decals away in the spares box.

The Microscale Decal sheets cost **£1.82** each, including VAT. Both ranges are available from: Hannants, 56 London Road North, Lowestoft, Suffolk NR32 1EP.

The Matchbox Voodoo

Hasegawa has an excellent 1:72 scale kit of the McDonnell RF-101C, the single-seat reconnaissance fighter variant of this big twin-engined jet aircraft, but as far as I am aware there has not before been a kit of the two-seat version in this scale — until the new kit from Matchbox. Two-seat Voodoos have been the subject of kits by Revell and Monogram, but these models were not to a recognised scale. This new kit permits one of three different versions to be modelled, the McDonnell F-101F, the RF-101B or the Canadian CF 101B.

The overall shape of this new model is good, but it does suffer a little from the complicated assembly. Care is necessary in fitting the wing parts and the modeller should ensure that the parts fit well before cementing — especially in the engine intake area. The ailerons, rudder and air brakes are separate components.

Surface engraving on this model is delicate and consists of raised skin and panel lines. This is a departure from the usual Matchbox style of a mixture of raised and indented lines. A feature that should appeal to those who prefer their models to have a less static appearance, is the moving tailplane. The joint system works well, but a little filling of joints between the component parts is necessary to improve the exterior finish of the fin. Another small point of criticism of this model is that the canopy has rather heavy framing, but this could be reduced, taking care not to scratch the clear areas. With a little work, such as filling and sanding the extensive joints, this makes up into a very nice model.

The three variants that can be modelled from this kit vary mainly in the nose area. The F-101F has a sensor forward of the windscreen, the RF 101B has a special fairing under the radome and the CF-101B has a flight-refuelling probe forward of the cockpit. Under the fuselage, hard points carry two long range tanks.

The markings sheet is excellent, being comprehensive and very well printed. The F-101F Voodoo is from the 'Happy Hooligans', 178th FIS, North Dakota ANG, based at Hector Field, Fargo. The RF 101B Voodoo subject is a three tone camouflage aircraft of 192nd TRS, Nevada ANG, based at Reno in 1972. The CF-101B Voodoo is from No 409 'Night Hawk' Squadron, Canadian Armed Forces, based at Comox Base, Canada, in 1970.

Another Dassault Mirage

ESCI has already produced 1:48 scale kits of the Dassault Mirage IIIE and Mirage 5, and has now followed these with a Mirage IIIC. This variant of the Mirage III has a shorter front fuselage than on the later marks and the intakes are consequently alongside the canopy.

This new kit shares a lot of common components with the kits of the IIIE and Mirage 5, but the fuselage section is different; the jet pipe and fairing, too, are new components, being considerably longer.

This is another fine kit, with high quality mouldings and excellent fit of parts. Engraving is of a very high standard and the detail inside the undercarriage bays, on doors, undercarriage legs and wheels enhances the appearance of the kit.

This model carries two underwing long-range tanks and two Sidewinders on the four under-wing pylons.

Markings are given for two Mirage IIICJ fighters of the Israeli Air Force, a Mirage IIICZ of No 2 Squadron, South African Air Force and a Mirage IIIC of *EC 3/10 Vexin*, of the French Air Force.

I don't know if we have reached the end of the ESCI permutations on the Mirage III variants, but they have not yet produced a two-seat model!

Apologies

We would like to apologise for the mis-captioning of the two illustrations that appeared in James Goulding's article 'RAF black wing identification schemes (part 2)' — see *Aircraft Illustrated* May 1981. The caption on page 223 of course referred to the diagram on page 224 and vice-versa

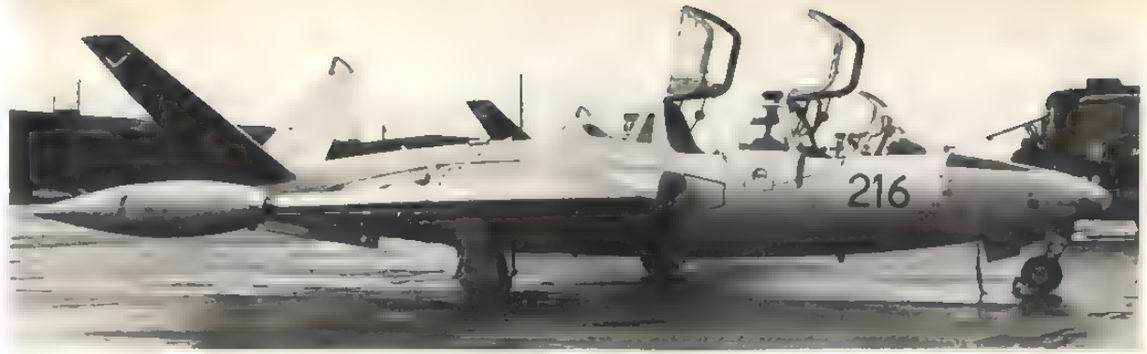
airregister

Compiled by **A. J. Wright**

THE IN SEQUENCE allocations continue to gallop through the G-BIs, although the current batch contains 25 balloons of varying shapes and sizes. Of the rest there is little outstanding. The Chinook has been about for some time, while the Boeing 737 is operated by Britannia Airways on behalf of Owners Services Ltd. The marks G-MALA were originally issued to a Cougar which later became G-BHBC. It will be interesting to see if this is classed as a re-issue, a trend as yet not rife.

Registration	*Type*	*C/n*	*Owner or Operator*
G-BHLO	Cessna 441 Conquest	0226	Northair Aviation Sales Ltd
G-BIDO	CP301A Emeraude	327	T. J. N. H. Palmer & G. W Oliver
G-BILE	Scruggs BL-2B balloon	81231	P. D. Ridout
G-BILG	Scruggs BL 2B balloon	81232	P. D. Ridout
G-BILP	Cessna 152	83741	Skyviews & General Ltd
G-BILR	Cessna 152	84822	Skyviews & General Ltd
G-BIMO	Stampe SV-4C	394	R. K. G Harrington (F-BADG)
G-BIMZ	Beech 76 Duchess	ME-169	Barrein Engineers Ltd
G-BIOW	Slingsby T67A	1988	Slingsby Engineering Ltd
G-BIPA	AA-5B Tiger	0200	J. D. Peace
G-BIPO	Avion Mudry CAP20LS	03	Personal Plane Services Ltd & Pace Petroleum Ltd
G-BIPT	Jodel D112	1254	C. Knowles (F-BMIB)
G-BIPU	AA-5B Tiger	0900	MLP Aviation Ltd (N28941)
G-BIPV	AA-5B Tiger	0981	MLP Aviation Ltd (N28266)
G-BIPZ	Gyroplane Mk4-4	Mk4-4	B. McIntyre
G-BIRE	Colt 56 Bottle balloon	323	Hot Air Balloon Co Ltd
G-BIRF	BAe748 srs 2B	1781	BAe Public Ltd Co
G-BIRH	PA-18 Super Cub 135	18-3853	I. R. F. Hammond (PH-LET/ R-163 RNeth AF/ 52 2453)
G-BIRJ	Cessna F172P	2083	Rogers Aviation Sales Ltd
G-BIRK	Avenger T200/2112 balloon	006	D Harland
G-BIRL	Avenger T200/2112 balloon	008	R Light
G-BIRM	Avenger T200/2112 balloon	007	P Higginson
G-BIRN	Short SD3 30	3067	Short Bros Ltd
G-BIRP	Arena Mk17 Skyship balloon	01	A. N. Viel
G-BIRS	Cessna 182P	61426	Rogers Aviation Sales Ltd (G-BBBS/N21131)
G-BIRT	Robin R1180T	276	Headcorn Flying School Ltd
G-BIRV	Benson B8MV gyrocopter	RH-1	R Hart
G-BIRX	Scruggs RS500 balloon	81530	J. H. Searle
G-BIRY	Cameron V-77 balloon	715	J. J. Winter
G-BIRZ	Zenair CH250	2454	S. M. Kewalski
G-BISB	Cessna F152	1816	Rogers Aviation Sales Ltd
G-BISE	Enstrom F280C-UK-2	1218	Spooner Aviation Ltd
G-BISG	FRED srs III	RAC01-224	R. A. Coombe
G-BISH	Cameron O-42 balloon	707	P. J Bish & C Hall
G-BISK	Commander 112B	535	Rogers Autos Ltd (PH-EBE/ N1469J)
G-BISL	Scruggs BL 2B balloon	81233	P D Ridout
G-BISM	Scruggs BL 2C balloon	81234	P D Ridout
G-BISS	Scruggs BL-2C balloon	81235	P D Ridout
G-BIST	Scruggs BL 2C balloon	81236	P D Ridout
G-BISV	Cameron O 65 balloon	712	Hylyne Rabbits Ltd
G-BISW	Cameron O 65 balloon	713	Hylyne Rabbits Ltd
G-BISX	Colt 56A balloon	324	Aquarius Balloon School Ltd
G-BISY	Scruggs BL-2C balloon	81237	P T Witty
G-BISZ	Sikorsky S-76A	760156	Bristow Helicopters Ltd
G-BITA	PA-18 Super Cub 150	8109037	N T & M Smith
G-BITF	Cessna F152	1822	Agricultural & General Aviation Ltd
G-BITG	Cessna F152	1824	Agricultural & General Aviation Ltd
G-BITH	Cessna F152	1825	Agricultural & General Aviation Ltd
G-BITI	Scruggs RS500 balloon	81539	A. E Smith
G-BITK	FRED srs II	29-10369	B. J Miles
G-BITL	Horncastle LL 901 balloon	206 1	M J Worsdel
G-BITN	Short Albatross balloon	DKS-002	D K Short
G-BITO	Jodel D112D	1200	A Dunbar (F-BIUO)
G-BITP	Scorpion Mk1 balloon	004	T A Poole
G-BITR	Sikorsky S-76A	760157	Bristow Helicopters Ltd
G-BITS	Drayton B 56 balloon	MJB 01	M J Betts
G-BITT	Bolkow Bo208C	689	M Hutton (F-BRHX)
G-BITU	Short SD3 30	SH3066	Short Bros Ltd
G-BITV	Short SD3 30	SH3068	Short Bros Ltd
G-BITW	Short SD3 30	SH3070	Short Bros Ltd
G-BITX	Short SD3 30	SH3069	Short Bros Ltd
G-BITY	FD-31T balloon	2604	A. J. Bell
G-BITZ	Cremer-Sandoe PACDS 14 balloon	41	P A Cremer & C D Sandoe
G-BIUA	BN-2A Islander	916	Pilatus BN Ltd
G-BIUB	BN-2A Islander	917	Pilatus BN Ltd
G-BIUC	BN 2A Islander	918	Pilatus BN Ltd
G-BIUD	BN 2A Islander	919	Pilatus BN Ltd
G-BIUE	BN 2A Islander	920	Pilatus BN Ltd
G-BIUF	BN-2A Islander	2027	Pilatus BN Ltd
G-BIUG	BN-2A Islander	2028	Pilatus BN Ltd
G-BIUH	BN-2A Islander	2029	Pilatus BN Ltd
G-BIUJ	BN-2A Islander	2030	Pilatus BN Ltd
G-BJAC	Boeing Vertol 234LR Chinook	M2001	British Airways Helicopters Ltd (N234BV)
G-BMFA	Cessna 180F	51219	E W Addicott (G-BDVR)
G-DINA	AA-5B Tiger	1218	Cabair Ltd (N4555Y)
G-FLIX	Cessna E310P	0221	Peter Long International Ltd (G-AZFL/N5921M)
G-GLUE	Cameron N 65 balloon	390	M F Glue
G-GWYN	Cessna F172M	1217	Citation Flying Services Ltd (PH-TWN)
G-INMO	PA 31-310 Navajo	8112021	Sabaru UK Ltd (N4074Q)
G-MALA	PA 28 181 Archer II	8190055	M A Lenihan & Associates (G-BIIU/N82748)
G-OSLA	Boeing 737 2U4	22576	Britannia Airways Ltd
G-OTVX	PA-28 201T Turbo Arrow III	7703293	M A M Quadrin (SE-GPZ)
G-OWJM	AB-206B JetRanger	[redacted]	J M Gow (G-BHXV)
G-SMJJ	Cessna 414A	0425	Rogers Aviation Sales Ltd (N2694H)
G-SSSH	BAe 146	E1-001	British Aerospace Aircraft Group
G-THEA	Boeing E75 Stearman	75-5736A	L M Walton
G-WIXY	Avion Mudry CAP10B	77	G Tanner & P O Wicks Ltd (F-BXHQ)

A registration featured in this column in the April issue of *Aircraft Illustrated*, was G-TACE as carried by BAe 125 srs 403B. The aircraft (ex-G-AYIZ) is seen at Leeds/ Bradford Airport on 26 March. *Photo: Colin Addison*



Above: The Super Magisters at Baldonnel are kept in immaculate condition, like this example, 216, just returned from a training flight. *All photos: Peter R. March*

airview SPECIAL

Peter R. March

The Irish Air Corps

The Irish Air Corps was formed nearly 60 years ago as an integral part of the Irish Army. It has never been a large force and for much of its existence has operated solely in support of the Army at home and in maintaining the sovereignty of the country. However, during the past 10 years its tasks have widened appreciably and with this, increased resources have been made available for new equipment and facilities. Today the Air Corps continues its support for the Army, both in training, exercises and active work to maintain internal security. A major effort is concentrated in providing aerial escort duties, air cover and support for military and police patrols in the border areas. Helicopters are used for airborne transport of both police and army personnel where rapid deployment is required or for access to the more remote sections of the Northern Ireland border.

The Army Co-operation Squadron equipped with Reims-built Cessna FR172H Rockets is based at Gormanston. This is a grass airfield south of Drogheda close to the Army firing ranges along the coast. In March 1981 the squadron had seven aircraft on strength (203, 205 and 206 all delivered on 4 October 1972 and 207-210 delivered on 13 October 1972). They are used for the full range of AAC duties and even have the provision for underwing rockets and can be fitted for target towing. With the retirement of the Doves they have also been used for limited photography and survey duties for the Irish civil authorities. While on such a flight, one of the Rockets (No 204) crashed into the River Shannon on 20 September 1978, the wreckage was recovered and is deposited at Baldonnel. A replacement Rocket has been purchased and was due for delivery in April, probably serialled 242.

Rotary wing activity is centred at Casement Airfield, Baldonnel where the headquarters, training, maritime and transport, technical and maintenance elements of the Corps are also based. This airfield, situated west of Dublin, has a 6,000ft hard runway, a newly built air traffic control and a range of navigation aids. Its hangars, however, date back to the earliest days of the Air Corps and are in urgent need of modernisation. The Helicopter Squadron is currently equipped with eight SE3160 Alouette IIIs (195 and 196 delivered on 25 November 1963, 197 on 31 May 1964, 202 on 24 March 1972, 211 on 4 February 1973, 212 on 29 March 1973, 213 on 16 December 1973 and 214 on 25 March 1974) and two SA342L Gazelles (237 delivered on 29 December 1979 and 241 on 14 January 1981).

The Alouette IIIs are used for work with the Army, particularly in the border area. For this purpose two helicopters are normally based on detachment at one or more of the specially made helipads. The squadron also has a year-round search and rescue task with a helicopter and crew on permanent stand-by. In summer the Alouettes are kept busy making the usual rescues of civilians around the coast who get into difficulties while swimming or in small boats; they are also involved in mountain rescue work and as airborne ambulances. Unfortunately the Alouette lacks range and equipment to fly in icing or other severe conditions, which hampers its winter SAR capability. From time-to-time this necessitates calling in the RAF with its Sea Kings and Wessex to provide rescue assistance. The Air Corps hopes to be able to overcome this limitation by the mid-1980s with the purchase of Aerospatiale Super Pumas. In anticipation of this an SA330J Puma is to be leased from the manufacturers in the very near future to extend the SAR capability and troop-carrying capacity of its helicopter fleet.

The two Gazelles are tasked for training and VIP transport duties. Being the latest version of this versatile helicopter they are fitted with IFR equipment which enables them to be used for the full training programme for pilots and communications tasks on a day/night basis. Future requirements include the purchase of three ship-borne helicopters to operate from the two Irish Navy 'Corvette class' vessels currently under construction. At present the Aerospatiale Dauphin N is the front-runner for this order. The Irish Police are also looking for additional helicopter support and although it was thought last year that they might purchase their own machine, it now seems more likely that the task will fall to the Air Corps. Again the Dauphin is favoured as it would also be a natural successor to the Alouette III, some of which are getting near to their 5,000hr life. In the latter half of the decade the Rockets will also need replacement (they are currently having an up-dated avionics fit) and again French helicopters are favoured for this role.

Another sphere of activity that has grown considerably in importance is fishery protection and coastal security. This task is performed by the Maritime and Transport Squadron based at Baldonnel. The bulk of the flying being up to 100 miles off-shore, with the need for speed and endurance paramount in the fishery protection role, a Beech Super King Air A200 was leased in March 1977 and entered service the following month. The type proved successful for the maritime and transport tasks and three are now on strength (232 ex-SE-GRR/EI-BCY delivered 11 March 1977, 234 ex-N4914M/EI BFJ on 12 July 1978 and 240 on 23 May 1980). A fourth Super King Air is on order for delivery later this year and it will be equipped for aerial photography.

Common Market meetings in Brussels, Strasbourg and other European centres, introduced the need for a high speed VIP transport for government ministers and officials. Accordingly a BAe 125 srs 700 was ordered in 1979 and in anticipation of the delivery, the Air Corps leased a srs 600 aircraft serialled 236. This latter example was delivered on 1 June 1979 but was

Left: Latest delivery to the Air Corps by March 1981 was this second Gazelle, 241, for training and VIP transport duties.

Right: The Reims Rocket looks somewhat unusual in military guise — for use in Army co-operation at Gormanston. The aircraft was photographed when it visited Casement Airfield at the end of March.

Below: One of the Alouette IIIs is kept at instant readiness at Baldonnel for SAR duties.

unfortunately badly damaged in a take-off accident later in the year. It was replaced by 239 on 6 December 1979, subsequent to the delivery of the BAe 125 srs 700B (serialled 238) which was handed over on 13 February 1980.

The Irish Air Corps standardised its basic and advanced flying training on the SIAI-Marchetti SF260WE Warrior in 1977. Student pilots follow a year long course which provides 160hr flying on this type. Ten aircraft were originally delivered (222-225 on 4 March 1977 and 226-231 on 16 April 1977), but one was lost on 24 January 1978 when 224 was cart-wheeled by a student in a spectacular fashion at Baldonnel; it was replaced by 235 which was delivered on 2 April 1979. The Warrior is also used for light-strike and army co-operation duties from time-to-time, and has under-wing provision for guns and rocket pods. The final 40hr of the student pilot's training course is on the Fouga CM170 Super Magister with the Light-Strike Squadron. Six of these re-worked twin-jets have been on strength since 1976 — the first four were ex-Austrian Air Force aircraft and the final pair had been intended for the Congolese Air Force. Initial delivery of 215-216 was on 11 August 1975, followed by 217-218 on 16 February 1976 and 219-220 on 13 November 1976. An additional ex-French Air Force Magister No 79 (3-KE) is used for ground instructional purposes. It is allocated the Air Corps serial 221 but does not carry it.

Examples of some of the former equipment of the Air Corps can be found at Baldonnel serving with the Apprentices School. These include Provost T1s 177, 178 and 183, all of which are shortly to be offered for sale. There are several Chipmunks, including 172 and the wreckage of 166. A Cessna 172, G-ARLU, which had been damaged by a storm in the UK, and SF-260C, I-SYAS (233), are both used for training purposes in the School.

The Irish Air Corps' 60th year will see it expanding its operational roles and advancing its equipment to meet new tasks. If the decade ends the way it has begun it can be expected to be a very different force than it has been for much of its history. Aircraft and helicopters on the inventory will be more numerous, ranging from a full squadron of Super King Airs and BAe 125s to Super Pumas and Dauphins. The Magisters, which will be time-expired by about 1985 will probably have been replaced by Alpha Jets and the Warriors will be just reaching retirement. Let's hope that those historic hangars at Baldonnel will still be standing then!

Light and commercial

There has been an appreciable increase in club and private flying in Ireland during the last 10 years. At present there is over 330 aircraft registered, of which 80% are used for club, private or business flying. There are 30 operational airfields and strips in the country and a similar number of flying clubs and registered groups operating from them. A wide range of aircraft types are in use, with Cessna 150s and 172s and Rallyes in the majority. There does not seem to be the same enthusiasm for homebuilt and ultra-light aircraft as in the UK however, judging by the few examples of completed projects on the register. But maybe this is just a matter of time. One light aircraft type to appear in the Republic before the UK is the Beech Skipper. Two examples were brought in early-1980 by Avair, who exhibited EI-BHU at Farnborough in September, managing to sell it to a customer in Norway.

Avair is a fast growing business-charter operator which has established itself as the major company in this field, based on its Beech dealership. It operates a fleet of A200 Super King Airs including EI-BJY which was delivered in February this year, and EI-BFT, EI-BHA, and EI-BIP, also Baron, EI-BEW, and Navajo, EI-BGR. A Beech 99 is the latest addition to the company's operations. Avair has also recently received planning permission to build a comprehensive general aviation terminal at Dublin Airport. On the rotary wing side Irish Helicopters continues to operate an assortment of types for charter work. The S-61N, EI-BHO, has returned from Scandinavia and will be joined by a similar machine from Okanagan Helicopters for the summer exploration season.

Aer Lingus is not making any major changes to its fleet for the 1981 season, except the addition of the third Boeing 747, back from lease. The company completed a major overhaul of B747, EI-ASI, which lasted two months. This work included the installation of new galleys and major structural modifications to the cabin floor and was the biggest B747 task to be coped with by the airline. Boeing 747, EI-BED replaced it in the workshops on 9 March, while British Airways is tackling the work on EI-ASJ at Heathrow. For its European schedules Aer Lingus is operating four BAe One-Elevens, 12 Boeing 737s (including the Guinness Peat Aviation-owned EI-BEE) and a Boeing 707 from the trio remaining on strength.

Aer Turas has yet to find a buyer for its Britannia EI-BBH. In the meantime it has continued in occasional use, including the transport of horses to and from Bristol for the Cheltenham Races in March. There has not been a great deal of long-haul work for the Canadair CL44J, EI-BGO. It was modified during the winter with a roller floor for containers, but spends much of its time sitting on the tarmac at Dublin. However, there is more optimism about the air-freight business for later this year and Aer Turas is hoping to have a busier time then.

Wrecks and relics

While surveying the Irish air scene it is worth putting on record some of the wrecks, relics and preserved aircraft in the Emerald Isle. The Air Corps has a small collection of aircraft at Baldonnel, all of which are due to be moved elsewhere during the next few months. Magister 34 has been restored for exhibition purposes by Air Corps apprentices and awaits removal to the Irish Aviation Museum at Dublin Airport. However the untimely death of the museum's curator Capt J. C. Kelly-Rogers has held up the move. Likewise it was planned to transfer Vampire T11 191 to Dublin Airport. Alongside it Vampire T11 192 is to go to the Dublin Institute of Technology at Bolton Street — here it will join Cherokee, G-ATHI, Aztec, G-AYWY, and Tiger Moth, EI-AOP, for instructional purposes.

Below: The third Irish Air Corps Super King Air, 240, receiving attention in the hangar at Baldonnel, March 1981.

Anson 19 141 has received modest attention from the Air Corps apprentices and is shortly to be offered for sale, as are Provosts 177, 178 and 183. Two of this trio are in near airworthy condition and could become welcome additions to the handful of Provosts kept flying.

At Dublin Airport the Irish Aviation Museum in the main terminal building accommodates DH Dragon, EI-AFK, (ex-G-AECZ) painted as EI-ABI, and the nose section of Viscount, EI-AOH. Scattered about the airport there are even more interesting relics, L749A Constellation, N7777G, (ex-PH-TET and PH-LDT) is beginning to look the worse for wear outside the Aer Lingus hangar. Nearby the Aer Turas Britannia, EI-BAA, continues to be robbed of components to keep its sister aircraft EI-BBH flying. Boeing 707, VP-BDF, is also in an advanced state of destruction. Looking much healthier though, is TB-25N Mitchell, N9455Z/151863, one of the six that came to England for the film Hannover Street, but only reached Dublin on its way back to the USA on 28 February 1979. The two Dakotas, EI-BDT and EI-BDU, of the now defunct Clyden Airways have been sitting on the apron since the company failed last year. Eastern Airways has been operating the night mail flights with one of its fleet of Dakotas, so three of the type can normally be seen on a daytime visit.

On the light aircraft scene in the Republic there are not a large number of truly vintage types preserved. At Powerscourt there is the 'Blue Max' collection which occasionally goes on public display. These film replicas include SE5As, EI-ARI to EI-ARL (ex-G-AVOU to G-AVOW and G-AVOY); Fokker DVIIs, EI-APT to EI-APV (ex-F-BNDF to F-BNDH); and Fokker DrI, EI-APW (ex-G-ATIY); Pfalz DIIIs, EI-ARC and EI-ARD (ex-G-ATIF and G-ATIJ). There are several Avro Cadets dotted about in various states of restoration, including EI-ALP (ex-G-ADIE) at Castlebridge and EI-ALU at Dublin, Russell Winn's strip at Kilbrittain has long been a refuge for Miles Gemini variants. These include the airworthy EI-BHJ (previously G-ALZG), G-AKEL, G-AKGE, G-ALCS and Aries G-AOGA. At Shannon the Naval Aircraft Factory N3N-3, EI-BEY (ex-N45037), is back in the air again for the 1981 season of airshows in Eire.

airevents 81

April saw the start of the 1981 air events season proper. The Vintage Aircraft Club organised its annual Daffodil Rally at Finmere on 5 April, but unlike last year when it attracted 70 visitors, this year the weather was unkind and only about 20 were able to get under the low cloud and drizzle. Amongst those that did get through was an interesting trio from the Forest of Dean, newly restored Tipsy B, G-AISA, Piper Cub, G-BDHK, and Turbulent, G-ASFX. The first fly-in of the Jodel Club at Popham on 12 April was more lucky. Over 30 of these crank-winged aircraft flew into the Hampshire airfield and were supported by a further 20 miscellaneous types, including the Taylorcraft BC12D, G-BIGK, from Sandown and Stinson 108, G-BHMR, from Walkeridge Farm.

Since the publication of the 'UK & Eire air events 81' diary in *Aircraft Illustrated* last month, several changes have been announced and additional events notified. The list for the next four weeks is detailed below and incorporates these amendments. Readers are again reminded that they should check with organisers *before* setting out for an event, to confirm that it is taking place on the date shown, at the announced venue and is open to the public. One change for July which is hardly surprising considering the 'rival event' on its original date (29 July) is the RN Air Day at Culdrose. This has been brought forward a week to 22 July.

May

9	Shanklin, IOW: Air Carnival (Red Arrows)
9-10	Holbeach St Johns, Lincs: Flower Fly-in
9-10	Middle Wallop, Hants: PFA Andover Strut Fly-in
10	Popham, Hants: British aircraft Fly-in
10	Staverton, Glos: RAF Innsworth, Air Display

Left: A rare propliner, this L749A Constellation, N7777G, has been a long-term resident of the Aer Lingus parking area at Dublin.

Below left: Considering it has spent two years sitting on the apron at Dublin Airport, this TB-25N is not too bad for wear. Having been offered for sale for some time, it has been surveyed recently prior to a possible departure.

Right: Another surprising shape in the sky (see pages 276-277 this issue — *Ed*) is the Cameron 'thatched cottage' G-COTT which temporarily carried the registration G-HOUS before it was realised that the latter was already in use. The balloon was seen at Ashton Park, Bristol in mid-February.
Photo: Peter R. March

10	Cardiff-Wales, S Glam: Cambrian Flying Club Fly-in
16-17	Biggin Hill, Kent: International Air Fair
16-25	Greenham Common, Berks: UK National Gliding Championships
17	Hereford: RAF Hereford Event
17	Shobdon, Hereford: Hereford Sports Centre Fly-in
17	Tollerton, Notts: Sherwood Flying Club Brunch Fly-in
17-19	East Fortune, Lothian: Museum of Flight Open Days
21	RAF Brawdy, Dyfed: RAF Open Day
23-24	Eglinton, Londonderry: Fly-in and Rally
23-24	Mildenhall, Suffolk: USAF Air Fete 81
23-24	Glenforsa, Mull: Highland Aero Club Fly-in
23-25	Boston, Lincs: Vintage Aircraft Club Spring Camp
24	Denham, Bucks: GAPAN Garden Party and Air Display
24-25	Long Marston, Warks: Air Display
24-25	HM Naval Dockyard Chatham, Kent: RN Navy Days
25	Bulstrode Park, Bucks: Tiger Club Air Display
25	Henlow, Beds: RAF Henlow Open Day
28	Portland, Dorset: HMS *Osprey* Families Day
28-31	Lulsgate, Avon: Hannover Flying Club Fly-in
30	Waddington, Lincs: RAF Open Day
30	Cheltenham, Glos: 1981 Colt Car Helicopter Challenge Cup Event
31	Old Warden, Beds: Shuttleworth Flying Day
31	Barton, Gtr Manchester: Manchester Air Show
31	Squires Gate, Lancs: Blackpool Air Display

June

5-7	Gamston, Lincs: Air Fair
6	Prestwick, Strathclyde: Scottish International Air Show & HMS *Gannet* Air Day
6	Old Warden, Beds: Shuttleworth Flying Evening
6	Broughton, Cheshire: BAe Families Day
6	Blackpool, Lancs: Red Arrows Display
6-7	Henstridge, Somerset: PFA Training Weekend
6-7	Furness, Co Kildare: Ballooning Summer Get-Together
6-7	Southend, Essex: Out-of-Sequence Registrations Fly-in
6-7	HM Naval Dockyard Rosyth, Strathclyde: Navy Days
7	Mellerstain, Gordon: Air Display
7	Seething, Norfolk: Waveney Flying Group Air Show
7	Finmere, Bucks: Vintage Aircraft Club Fly-in
7	Gowran Grange, Co Kildare: Leinster Aero Club At Home
7 & 9	Isle of Man: Red Arrows Displays at TT Races

Airshow announcements

The 'USAAF WW2 Memorial Flight', together with the Cavalier Air Force, has announced its plans for the 1981 airshow season. The Flight's first appearance will be at Staverton on 10 May and thence at US military air displays throughout England, at Soesterberg in Holland and at Ramstein and Zweibrucken in Germany. The aircraft will be drawn from the existing fleet of two B-25Js and a C-47; a Douglas B-26 will be added from mid-June onwards. This latter aircraft will be flown by John Hawke and will be participating in the Paris-New York Air Race held in conjunction with the Paris Air Show. The 'USAAF WW2 Memorial Flight' organisers are Mark Russell and Carol Barritt, together with Mrs Elizabeth Bullock. They would be pleased to hear from any engineer or show specialists who would like to participate in the operations of the Flight and can be contacted on 01-788 1808 or PO Box 12045, 3004 GA, Rotterdam Airport, Holland.

At the Air Britain International Fly-in at Old Warden on 12 July, eight veteran aircraft will be on hand for pleasure flights in return for a donation to the Shuttleworth Trust de Havilland Hangar Appeal. The aircraft concerned and donation required for each seat taken up (available on a first-come basis on the day) are as follows: DH89A Rapide (£15), DH82A Tiger Moth (£25), DH80A Puss Moth (£35), DH83 Fox Moth (£40), DH60G Moth (£45), DH94 Moth Minor (£50), DH90 Dragonfly (£75) and AT-6D Harvard (£100).

For this month's contributions we would like to thank: A. J. Brown, K. Ellis, G. Finch, A. March, I. MacFarlane, E. A. Shackleton and R. Wright. Also the publications *Aero Ireland, Aviation Ireland, Flypast, Irish Air Letter* and *Scottish Air News*.

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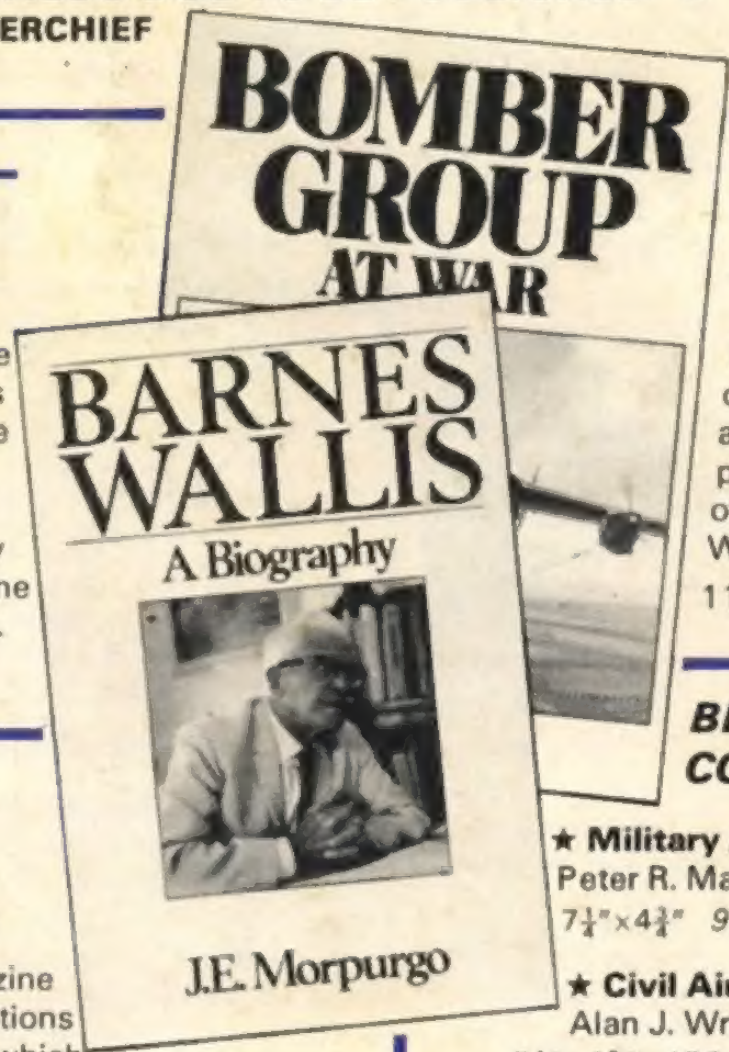

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